Kit Building Special

Kit Reviews
Hands Electronics 3.5MHz & The Ramsey Electronics 144MHz Receivers

Kit Showcase Guide
Find The Kit You Need

New Series
For All Computing In Radio Enthusiasts
Join Peter Hunter GOGSI In The 'Bits & Bytes' Shack

Antenna Workshop
By Peter Dodd G5LDO

Plus
Spot The Difference Competition - Boxing It Up - Getting Started The Practical Way - Subs Club And Much More!
Yaesu's Pair of Aces

The FT-26/76 hand-helds make your life simple with all the features you will ever need. They're easy to use and designed to fit comfortably in your hand, and weighing in at just one pound each, the FT-26/76 lets you travel light.

For complete details on these hand-helds call your nearest Yaesu dealer now!

FT-26/FT-76 Hand-helds that make your life simple

- FT-26: 144-146MHz, FT-76: 430-440MHz
- Supplied as standard with FNB25 and NC28C.
- 53 Memory Channels.
- 5 Watt Output, 12V DC NiCad Batteries Available.
- Four User-Programmable Power Levels (with FNB-27).
- Built-In Vox.
- Built-In DTMF calling For Selective Or Group Calling.
- Backlit Display and Front Buttons.
- Direct 12-Volt Operation With E-DC-5 Adaptor.
- Key, PTT and Dial Locking.
- Automatic Repeater Shift (ARS) Built-In For 2 Meters.
- Automatic Power Off.
- Selectable Channel Steps.
- Automatic Battery Saver.
- User Selectable Channel-Only

Display, Simple Operation For New Hams.

Accessories Options:

Performance without compromise
YAESU - ICOM - ALINCO - KENWOOD - JRC - DRAKE - DAIWA - AOR - TOKYO HY-POWER

ARE
COMMUNICATIONS '92

KENWOOD
TM732E
The best dual band package money can buy, just look at what it has to offer. Remote head facility, wideband receiver with AM, simultaneous reception in same band, high power, cross band repeater...

YAESU
FT530
Full literature now available for what can only be described as one of the most unique handhelds ever to be released on the market plus some very special options.

PHONE NOW FOR THE LOW-DOWN

YAESU
FT890/TU
The best dual band package money can buy, just look at what it has to offer. Remote head facility, wideband receiver with AM, simultaneous reception in same band, high power, cross band repeater...

YAESU
FT1000
Full literature now available for what can only be described as one of the most unique handhelds ever to be released on the market plus some very special options.

PHONE NOW FOR THE LOW-DOWN

ICOM
ICR7100HF
Still the best base scanner available on the market. No need for two receivers, listen to everything in one box or update your model with the ARE modification board.

KENWOOD
TS850S
Very special deals available as on the TS450S and TS690S with 6 metres.

AOR
1500 RCV
At last it's here 500kHz - 1300MHz in a hand held, with SSB, FM, AM, FM-W.

SECOND-HAND EQUIPMENT WANTED

KENWOOD
TM241E
Very special deals available as on the TS450S and TS690S with 6 metres.

YAESU
FT212RH
Simply one of the best HF transceiver. Now available with or without power supply, to suit your needs and your pocket.

DAIWA
POWER SUPPLIES - FULLY METERED
With 10, 30 and 40 amp units to choose from at prices for today's market.

TOKYO HY-POWER
These are the poweramps that deliver! A complete comprehensive range covering HF, 6m, 2m and 70cm with auto input select and power out that's stated.

YAESU
FT990
Simply one of the best HF transceiver. Now available with or without power supply, to suit your needs and your pocket.

No order is too small - No order is too large

ARE COMMUNICATIONS '92
6 Royal Parade, Hanger Lane, Ealing, London W5A 1ET
Easy parking at the rear of the shop. Part exchange and equipment purchases welcomed! Credit facilities available subject to status. APR from 37.8%. Located next to Hanger Lane tube station (Central Line) and on the junction of the A406 and A40.
Open Monday – Friday 9:30 – 5:30 Saturday 9:30 – 3:00

Don't delay phone or fax today! Tel: 081 997 4476 Fax: 081 991 2565

ARE COMMUNICATIONS is continually supplying good secondhand bargains as well as new equipment. If you require a detailed list of our secondhand stock or wish to be on our computer listing of what you are looking for please contact ALAN or JEZ with your requirements and we will try our best to fulfill your request.

Now also available due to demand will be an AFTER HOURS LINE which is to be used at your discretion. If you feel the answering machine is not good enough and you want the answer there and then on how much your rig is worth or what we have in stock, then phone ALAN on 0836 550899 - he might just make your day.

No order is too small - No order is too large

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LOWE HF RECEIVERS DO IT AGAIN!

HF-225 “FINLANDIA” voted “BEST DX RECEIVER 1992” at
the EDXC Convention in Finland. Final choice was from
HF-225, NRD-535 and IC-R72E.

LOWE ELECTRONICS LIMITED
Chesterfield Road, Matlock, Derbyshire DE4 5LE
Telephone: (0629) 580800 Fax: (0629) 580020

BRANCH ADDRESSES:
London (Middlesex): 223 Field End Road, Eastcote Tel: 081-429 3256
London (Heathrow): 6 Cherwell Close, Langley Tel: (0753) 545255
Newcastle: Newcastle International Airport Tel: (0661) 860418
Cumbernauld: Cumbernauld Airport Foyer Tel: (0236) 721 004
Bristol: 6 Ferry Steps Industrial Estate Tel: (0272) 771770
Cambridge: 162 High Street, Chesterton Tel: (0223) 311230
Bournemouth: 27 Gillam Road, Northbourne Tel: (0202) 577760
Leeds: 34 New Briggate, Leeds Tel: (0532) 452657
The DJ-580E hand-held is the most advanced design ever offered to the radio amateur. Building on the winning formula of the DJ-560E, ALINCO have now reduced the size dramatically and introduced a combination of innovative features that will make your operating even more fun and certainly more versatile.

It goes without saying that ALINCO offer you all the standard features you expect from a hand-held including dual watch, dual controls, scanning, searching, priority, etc. Of course ALINCO's standard of engineering and reliability is now becoming the envy of its competitors. (They're also pretty envious of ALINCO's prices!)

Naturally you get a full 12 month warranty including parts and labour. It's the extra features that really make this a winner.

For example you now have ALINCO's patented circuit that retains full operation with dry cells even when battery voltage falls by 50%. Great for emergency applications. You get a programmable auto power off feature, battery saver, digital telephone dialler and three output power levels. And we've only just started! Key in a special code on the keypad and your rig will turn into a fully operational automatic crossband repeater. Key in another code and you will open up the receiver for a.m. airband reception and frequency segments up to 995MHz! You can even use the DTMF feature to send and receive two digit code messages.

To learn more about the transceiver that has already taken the Japanese and American markets by storm, phone or write for a full colour brochure.

Available direct or from your local dealer

Auto repeater mode
AM Airband Reception
Expanded Receive to 995MHz

**UK "Gold Seal" Warranty**
Now with every unit
Look for the sign on the box!

**Specification**

<table>
<thead>
<tr>
<th>Tx</th>
<th>144-146MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>430-440MHz</td>
</tr>
<tr>
<td>Rx</td>
<td>AM 108-143MHz</td>
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<tr>
<td></td>
<td>FM 130-174MHz</td>
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<td></td>
<td>FM 400-470MHz</td>
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<tr>
<td></td>
<td>FM 810-995MHz</td>
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<tr>
<td>Steps</td>
<td>5, 10, 12.5, 20, 25kHz</td>
</tr>
<tr>
<td>Memories</td>
<td>42</td>
</tr>
<tr>
<td>Power Output</td>
<td>2.5/1.0/0.3 Watts</td>
</tr>
<tr>
<td></td>
<td>5 Watts with 12V DC</td>
</tr>
<tr>
<td>Scan</td>
<td>8 Modes</td>
</tr>
<tr>
<td>Tones</td>
<td>1750Hz plus DTMF</td>
</tr>
<tr>
<td></td>
<td>Optional CTSS</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>12dB SINAD -15dBu</td>
</tr>
<tr>
<td>Size</td>
<td>140x58x33mm</td>
</tr>
<tr>
<td>Weight</td>
<td>410g</td>
</tr>
<tr>
<td>Accessories Supplied</td>
<td>Ni-Cad pack, AC charger, belt clip, carry strap, dual band antenna</td>
</tr>
</tbody>
</table>

**WATERS & STANTON ELECTRONICS**

22 Main Road, Hockley, Essex. Tel: (0702) 206835
Retail and Mail Order: 22 Main Road, HOCKLEY, Essex SS5 4QS. Tel. (0702) 206835 / 204965
Retail Only: 12 North Street, HORNCHURCH, Essex. Tel. (04024) 44765
VISA & ACCESS MAIL ORDER: 24 Hour Answerphone. Open 6 days a week 9 am - 5.30 pm
Rail: Liverpool Street/Hockley or District Line/Hornchurch
HAM RADIO MAIL ORDER
Computerised Despatch 12 Months Warranty 10 Day Money Back Guarantee!

300 Watt Dummy Load
HF - 2 Metres
MFJ-260B
£35.95 Post £2.00
Air cooled SO-239
1 KW Version 1 - 650MHz
MFJ-264 £69.95 Post £4.00

ADONIS MICROPHONES
£65.95 P&P £3.00
Improve your Audio Quality
- Condenser Insert
- Matches Any Rig
- Response Selector
- Low Noise Amp
- PTT/LOCK/Up-Down
- Variable Output
Get rid of that old hand mic and experience the quality of ADONIS. Crisp, clear speech, the difference is amazing. Ask for matching rig plug when ordering.

DIAMOND POWER RANGE
Fibre Glass
- High Gain
- Loto VSWR
- Pre-Tuned
V-300 2m/70cm £129.95
V-80 2m/1.8 MHz £59.95
V-50 2m/500MHz £49.95
V-30 2m/65MHz £39.95
V-350 2m/1500MHz £31.95
V-700H 2m/70cm £29.95
X-500 2m/60cm £19.95

STATIC PROTECTORS
- DC-500MHz/1500MHz
- Protects Rig
- In-line coax
- Replacement Cartridge
CA-35R SO-239 Socket 300W £18.95
CA-23R “N” Socket 300W £21.95

MAST-HEAD PRE-AMPS
- N.F. 0.9dB
- Auto Switch
- Mast Clamps
- 12V DC Single wire
These famous MICROSET Pre-Amps are now widely used by enthusiasts around the world. Cuts out all receive coaxial cable losses and lets you hear signals not possible before! Essential for DX and contests. Fail safe supply feed.
PR-145 2m 400W £119.95
PRH-145 2m 100W £89.95
PR-430 70cms £99.95
Post £3

HANDY POWER METER
REVEX W-160
£39.95 Post £3
- 2m/70 cm
- Power/ VSWR
- 15/60W PFD
- Cast Alloy SO-239
Revex make superb Power Meters for industry. Designed for the Amateur market, the W-160 is ideal for mobile or portable use. Very compact and very accurate.

DUPLEXERS & TRIPLEXERS
- 50/15 Isolation
- 1KW HF 250W UHF
Save on cost. Ideal for mobiles 2 or 3 rigs to one aerial, 2 or 3 aerials to one rig!
D-24 HF 2m/70cm 2 x PL-259 £17.95
D-24N As above with one “N” plug £19.95
MX-3000N 2m/70cm/23cm £56.95
Post £3

0702 206835 “ACTION LINE”
HIGH QUALITY EARPIECE
EP-300 £10.95
P&P £1.25
Superb quality earpieces as supplied to Police Force. Clips over ear and cuts fatigue completely! Headphone quality. Ideal for RAYNET and extended operation. 0.8 Ohms fitted 3.5mm plug.

WINDOW MOUNT ANTENNA
WM-BNC £14.95 Post £2
Fits over any vehicle window to permit temporary mobile operation. BNC socket for aerial and thin 50 Ohm cable terminated in BNC plug. Ideal for hand-held radios.

HANDBY AERIALS!
DIAMOND RH-9 £21.95
Ideal for all those users of dual band hand-held radio or scanners. This compact, yet efficient aerial has been sold in its hundreds. You get a 144/430/900MHz plus wide band receive! Just 2.5" long!
DIAMOND RH-2SB £9.95
Just the thing for 2m hand-helds. Very efficient and very compact at just 4" long.
Spare 2m Helical Antennas. BNC fitting at trade price. Suits any hand-held. £6.95
SUPER-ROD 2M WHIP £14.95
The ideal way to add power gain to your 2m hand-held at lowest possible cost. Fitted BNC use as a 1/2 wave or extend to a 3/4 wave. Adds up to 10dB in performance! Add £1 Postage any aerial

DIAMOND
CP-6
80-40-20-15-10-6m
- Power: 200W
- Impedance: 50 Ohms
- VSWR: Less than 1.5:1
- Length: 4.6m
- Radials: 1.8m approx.
- Weight: 4.9kg
- Wind Rating: 90mph
- Mast Fixing: 1.5"-2.25" Socket
- SO-239
The ideal base station aerial for all those with restricted space. It comes absolutely complete including rigid radials. The low angle radiation of the CP-6 makes it superb for DX working. Easily adjusted, it provides very low VSWR thanks to the matching section which also reduces static. Ruggedly built, it comes with all the necessary clamps for immediate erection.
£239.95 Carriage £20.00

WATERS & STANTON
TO ORDER SEE INFORMATION ON NEXT 2 PAGES
Free Power Supplies with any hf 12v Transceiver!

**YAESU - KENWOOD - ICOM**

Genuine UK Stock! 12 MONTHS WARRANTY

**MFJ 20m QRP CW Rig** £179

The long awaited MFJ QRP rig has arrived. 5 Watts of CW with an excellent receiver including a 500Hz slit filter. You also get semi break-in, rig to rig and a variety of options.

**MFJ 1278 Multi mode Data Controller** £279

The MFJ-1278 is the most comprehensive data controller ever offered by us. It has more modes than any other model and is now outshining all other competitive units. You get 9 modes: Packet (including mail box) FAX, ANTOR, SSTV, RTTY, NAYTEX, ASCII, Electronic keyer, CW reader, plus a feature packed specification. Now is the ideal time to try all these interesting modes from one single box.

**MFJ Products from Stock!**

300W HF ATU

The MFJ-948 is a complete 300 Watt aerial matcher in one box. It will match coaxial, balanced feeder and single wires. A dual needle VSWR/Power meter makes adjustment simple and a 3 way aerial switch completes the package. Fantastic value! £129.00

**Ten-Tec Omni-VI 160-10m 0-100W** £2,495

The OMNI VI is different from any other hf transceiver you have used or even seen! Craftsman built, it employs beautifully assembled circuit boards that are easily accessible should you ever need to service them. The factory actually encourage you to take the covers off and examine the craftsmanship. No mass production here! Receiver experts agree that good old crystal mixing can’t be beaten and using this method the phase noise has essentially been eliminated. The OMNI-VI can receive signals on todays crowded bands that other popular models can’t even hear. Great for contests and DX! A truly quiet receiver.

The OMNI-VI is an engineers dream. Superb IF crystal filters, an automatic notch filter that can handle any number of heterodynes, pass band tuning, 10kHz RRT and DSP 5, audio filter. A 20MHz microprocessor takes care of all the programming with data entry being carried out from the front panel. The OMNI-VI has the fastest QSK in the business that gives effortless break-in operation on CW. You also get an Iambic keyer, 100 memories, a scratch pad and a true 100 Watt power control. Now you can run true QRP, even milliwatts with this rig.

We have a colour brochure on this fine transceiver. The price is correct at the time of going to press but may be subject to alterations owing to exchange rate fluctuations. Our mail order operation is the fastest and best-stocked in the UK. Virtually everything in this magazine is available from us and the chances are that we can get it to you within twenty four hours of receiving your order. We operate a completely computerised system with two terminals, and even have three staff solely packing goods. We also take care of your and your order. Everything we despatch is carefully checked, packed and insured against loss or damage. No risk to you whatsoever. And if the goods are not satisfactorily immediately upon arrival we will offer a full refund or an alternative item. Peter Waters G30JV/G8PEP

**Fastest Mail Order. We Promise!**

**AZDEN** £239.95!

Direct Factory Prices!

**PCS-7000**

- **2m FM 25 W** + Auto Tone-burst
- **AM Band** + Scanning
- **FM 138-174MHz** + Programme Shift
- **20 Memories** + Mic & Hardware

The AZDEN PCS-7000 is possibly the most understated rig available. It is simple to operate and can store tone-burst information in its memory. In order to prove we are, for a limited period, offering you the chance to purchase "factory seconds" to the tune of 20% off. All genuine current production models complete with all accessories, guarantee, warranty and carry the normal one year. Half the price of an equivalent rig.

**DiaMond**

**BASE STATION ANTENNAS**

- CP-4 .10-15-20-40m vertical with radials £149.00
- CP-5 .10-15-20-40m vertical with radials £199.00
- CP-6 .10-15-20-40-80m vertical with radials £219.00
- D-100N .Dx cover 25 - 110 MHz, 100 ft cable £84.95
- CP-22B .2m 3 x 58 x 58dB gain omni directional £49.00
- D-707 .Active n. 1.5-1300 MHz 12v £19.00

**FIBREGLASS VERTICALS**

- X-50 .2m/70cm 4.5/8.3/1.7dB gain 1.7m £29.95
- X-300 .3m/2m/70cm 6.5/9dB gain 3.1m £49.00
- X-510 .5m/50cm/2m 8.3/1.7/5dB gain 5.2m £69.95
- X-700 .7m/30cm/2m 9.3/1.7/5dB gain 7.2m £219.00
- X-522 .5m/2m/70cm 4.5/8.3/1.7dB £29.95
- X-500 .5m/2m/70cm/23cm 4.5/8.3/28/1.8m £109.00

**Hari**

**Hari Windom**

- **60-90m model**
  - NO TRAPS
- **40-20-17-12-10m bands**
  - NO TRAPS

**GW-80**

- 40-20-17-12-10m bands £69.95
- 80-10m bands £89.95

**Germaine Bercher Fuddle. A precision device 69.95**

**MFJ Products with Compact Option**

**G5RV**

**With Compact Option**

**Full Size**

<table>
<thead>
<tr>
<th>Size</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>8m +6</td>
<td>£21.95</td>
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<tr>
<td>6m</td>
<td>£19.50</td>
</tr>
</tbody>
</table>

**Compact Option**

Using one EL-420C coils you can operate the half size version on 80 meters without affecting its performance on the other bands. The length is increased by only a few feet but this added length of wire may be dropped vertically at the end, the overall size remaining the same. 80-10m is 66ft of space. coils.818.95 per pair.
**NEW!**

**ALINCO ELECTRONICS GmbH.**

**Super Sensitive Frequency Counter**

10Hz-3GHz! **£199**

We've purchased a quantity of the OptoElectronics 2810 frequency sniffers at well below the normal factory price and are passing the savings on to you! Used for checking out the frequency of remote transmitters, this unit will amaze you. It's got a beautiful clear LCD display, ni-cad battery, mains charger and telescopic aerial. There's a variable gate times, BNC inputs of 50 Ohms and 1 Meg and a bold button to store a frequency. It will sniff the average handheld at a distance of 100ft and base stations over much greater distances. Ideal for workshop, scanning enthusiasts and those who think they are being bugged! Full 12 months warranty.

**NEW!**

**ALINCO ELECTRONICS GmbH.**

**NEW!**

**NEW Packet Radio Kit**

**£49.95**

Ramsey — USA

P-IBM

★ Powered directly from RS-232 port.

★ Includes free software for IBM

Other Kits

AR-1 Airband VHF Rx **£22.95**

PF-1 FM broadcast Rx **£19.95**

HR-20 20m DC Rx **£25.95**

HR-40 40m DC Rx **£26.95**

HR-80 80m DC Rx **£28.95**

GRP-20 20m GRP Tx **£27.95**

GRP-40 40m GRP Tx **£27.95**

GRP-80 80m GRP Tx **£27.95**

This is a truly amazing kit for all those who want to get into packet radio without committing themselves to a large outlay. The complete kit of parts is provided with circuit, board layout and comprehensive manual. It can be put together in an evening. All you need is an RS-232 lead to your computer and cable connection to your transceiver mic socket. You'll be receiving and sending Packet signals in no time at all. If you haven't tried Packet radio, here's your chance to do so with minimum outlay and guaranteed results.

**NEW!**

**ALINCO ELECTRONICS GmbH.**

**DJ-180 2m Transceiver**

**£169.95!**

★ LCD Display

★ 10 Memories

★ Repeater Shift

★ 2 Watts Option

★ Ni-Cad Pack

★ AC Charger

★ Auto Power Off

★ Battery Warning

★ Steps 5kHz - 25kHz

★ Superb Audio

★ 132 x 58 x 33mm

Alinco break the price barrier again! Forget the cheap old-fashioned technology, this is brand new designed stock that will rock the market. Ideal as second rig or for those who only occasionally use 2 metres.

**DJ-F1E 2m FM**

**£259**

★ Tx: 144-146MHz

★ Rx: 108-174MHz

★ 5 Watts output (12V DC)

★ 40 Memories

★ 3 way Power Setting

★ Illuminated Key Pad

★ 6 Programmable steps

★ Programmable Shift

★ 1750Hz tone

★ Frequency Lock

★ PTT Lock

★ Beep on/off

★ Automatic Lamp

★ DTMF Tones

This amazing instrument enables you to tune your antenna system in minutes. It has built-in rf generator, frequency counter and meter. All self contained, simply connect to antenna system and watch the effect as you make adjustments in the garden. Amazing!

**FREE! Mail Order Price List. From UK's LEADING HAM RADIO STORE**

Important Notice: some prices may be subject to alteration owing to exchange rate variations. Please check when ordering.

**NEW!**

**ALINCO ELECTRONICS GmbH.**

**NEW!**

**NEW!**

**VISA & ACCESS MAIL ORDER, 24 Hour Answerphone. Open 6 Days a Week 9am-5.30pm.**

Rail: Liverpool St/Hockley or District Line/Hornchurch
No surcharge for Credit Cards
AS LEVIED BY SOME OTHER DEALERS

SALE SPECIALS
THIS MONTH ONLY!!!
OR UNTIL STOCKS RUN OUT

70% Off HX850E
SCANNER
60-89, 118-136, 140-174, 406-495 MHz
Was £305 Now £99.95

45% Off 430/726
70cms module for FT726R
Was £309 Now £169

60% Off 144TV
2m module for FTV107, 707, 901 etc
Was £125 Now £49

Antenna Specials

SQ144 2m SWISSQUAD Was £66 Now £39
88F 2m Mobile 5.2dB Was £24 Now £15
358 70cm Mobile 6.3dB Was £25 Now £15
268E 70cm Mobile 6dB Was £23 Now £15

ALL OFFER ITEMS SUBJECT TO CARRIAGE CHARGES.
FT736R - Probably the finest dualband base transceiver in existence - ideal for satellite operation - whole host of options available.

FT890 - Yaesu's latest HF winner available either with or without internal ATU - ideal for mobile/base - too many options to list - ring for details.

Rotators - We have a wide range of rotators to suit all applications from TV to multi-element HF antennas. Computer control is an option on some of the larger models to give extra flexibility of operation.

Linear Amplifiers - We have probably the best selection of linear amplifiers available on the market today. We have selected these ranges, Tokyo Hy-Power, Daiwa and Henry, for their outstanding reputation for performance, quality and reliability. Why not ring us now to discuss your requirements and the linear best suited to you.

ICOM - For some time now we have stocked many items from the Icom range including the extremely popular ICR1 and ICR100 scanners.

Kenwood - Some of our branches are able to supply the Kenwood range of products so if this is what you're interested in why not ring us today.

Here at SMC we do stock a wide range of power supplies to suit all applications. There are two major ranges to choose from, the Daiwa range and the Yaesu range. Both ranges are high quality products which will provide many hours of continuous fault free use. The models range from 4A to 32A continuous with convenient models at 9, 12, 20 and 24A. Many models have comprehensive current/voltage metering with prices to suit all pockets.

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage</th>
<th>Current/Max Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP700</td>
<td>13.8v</td>
<td>10A cont/20A peak</td>
</tr>
<tr>
<td>FP757HD</td>
<td>13.8v</td>
<td>20A cont.</td>
</tr>
<tr>
<td>FP800</td>
<td>13.8v</td>
<td>20A cont.</td>
</tr>
<tr>
<td>FP400C</td>
<td>13.8v</td>
<td>10A cont/20A peak</td>
</tr>
<tr>
<td>FP8</td>
<td>13.8v</td>
<td>8A cont.</td>
</tr>
<tr>
<td>SMC 120406</td>
<td>13.8v fixed</td>
<td>4A cont/6A peak</td>
</tr>
</tbody>
</table>

All the Daiwa range, except the PS140MKII, feature variable voltage with switchable voltage/current metering. Both the PS304 and RS40X feature a cigar lighter socket, convenient for powering your handheld transceiver.

| PS120MKII | 3-15v variable |
| PS140MKII | 13.8v fixed   |
| PS304     | 1-15v variable |
| RS40X     | 1-15v variable |

KENWOOD IS AVAILABLE FROM BIRMINGHAM, LEEDS & REG WARD

---

**Practical Wireless, January 1993**

---

**Birmingham 021-327 1497 Chesterfield (0246) 453340**
£30 off Europe's best selling oscilloscopes!

- Excellent quality, built to last a life time
- 2 year warranty
- Each 'scope supplied with 2 sets x10 probes, manual and mains lead.

**MULTIMETERS**

The D-MM good value meters are now even D-MMer good value!!

The TM series of low cost meters, with 3½ digit LCDs, full overload protection, strong ABS cases and packed with features. Supplied with test leads, battery and manual.

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<th>USUAL PRICE</th>
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<tr>
<td>HM205-7</td>
<td>20MHz, dual channel, 1mV/cm, component tester</td>
<td>£397.15</td>
<td>£367.00</td>
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<tr>
<td>HM205-3</td>
<td>20MHz, digital storage/analogue 'scope</td>
<td>£716.75</td>
<td>£686.00</td>
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<td>HM604</td>
<td>60MHz, dual channel, 1mV/cm, delay time base</td>
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<td>HM1005</td>
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**SPECTRUM ANALYSER ADAPTOR**

- 400kHz to 250MHz frequency range
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The new year brings some interesting changes in PW. Firstly, as I promised in the last issue, our new column 'Bit & Bytes - The Computer In Your Shack', written by Peter Hunter GOGSZ, makes its first appearance.

Peter intends to make 'Bits & Bytes' a thoroughly practical column. It's not going to be an academic series, and he's aiming to help you enjoy using the computer as it should be in our hobby - as yet another sophisticated tool.

'Bits & Bytes' will appear every other month, alternating with 'Packet Panorama'. In this way, I feel that I can best serve the needs of our readers. If you disagree, I'd be pleased to hear your opinions on the subject.

As from the February issue of PW, the 'Reflections' column written by Ron Ham will be replaced by a new series called 'Valve & Vintage'. Ron Ham's new column is being introduced because of the interest shown by readers in valves, valved gear and vintage equipment.

Feed-back from readers, plus my own feelings on 'Reflections', led me to think carefully about giving editorial space in PW. So, bearing in mind that the areas covered by 'Reflections' have often overlapped those in David Butler's excellent 'VHF Up' column in 'Backscatter', I have decided to make the changes.

Ron Ham is the ideal choice for the new column, as he spent over 40 years in the radio and TV servicing industry. During that time he acquired an enormously wide knowledge of servicing, history and practical hints and tips.

On the vintage equipment side, Ron was also the curator of the historical collection of radio equipment at the Chalk Pits Museum at Amberley in West Sussex. And although he's no longer doing that job, he still has contact with the museum.

In his new column, Ron intends to answer your letters, give advice and discuss various receivers, equipment, servicing and problems. He invites you to write to him with queries on older equipment, particularly if it's valved.

We're introducing this column because readers are continually asking for a regular series dealing with valves and the associated techniques. So, it's up to you to support 'Valve & Vintage', and Ron Ham will do his best to provide the column you want.

On Tuesday November 3, Tex Swann G1TEX and I spent an enjoyable evening with the South Dorset Radio Club in Weymouth. We'd been invited to provide a PW stand at what the club called an 'Activity Night'.

The event turned out to be a very well attended amateur radio promotional evening. The club had contacted the local evening newspaper, colleges, schools, the scouts and everyone was welcomed. Their idea worked, and interested people were already waiting as we arrived. As the event was held at the local football club's headquarters, several people (attending a match between local clubs) came in on the off-chance and were obviously interested.

Along with the PW stand, there were a number of others to interest the visitor including: an h.f. demonstration station, RAYNET, a s.w.l. set-up, a Morse stand manned by the Dorset RSGB examiner, an amateur TV demonstration (with excellent quality pictures) and a packet radio station.

There were also many Novice radio amateurs in evidence. I was particularly pleased to see that there were Novice licensees representing all age groups from 12 to 60 years.

It was a very successful evening. We'd only had a very short time to prepare for the evening, as the invitation came late. Despite this, when we were preparing, several telephone calls for help brought immediate responses from both the RSGB, and the Radiocommunications Agency. Because of the RSGB and RA co-operation, we were able to take copies of RadCom and the RA booklet How To Become A Radio Amateur, etc., with us. It just goes to show, that if we all work together, we can show other people what an enjoyable hobby radio can be!

Rob Mannon G3XFD

Queries
We will always try to help readers having difficulties with a Practical Wireless project, but please note the following simple rules:
1: We cannot give advice on modifications to our designs, nor on commercial radio, TV or electronic equipment.
2: We cannot deal with technical queries over the telephone.
3: All letters asking for advice must be accompanied by a stamped, self-addressed envelope (or envelope plus IRCs for overseas readers).
4: Make sure you describe the query adequately.
5: Only one query per letter please.

Back Numbers & Binders
Limited stocks of many issues of PW for past years are available at £1.50 each including post and packing.
Binders, each holding one volume of PW are available price £5.50 each (£1 P&P for one, £2 for two or more).
Send all orders to the Post Sales Department.

Subscriptions
Subscriptions are available both for the UK and overseas. Please see current issues for the latest prices.

Constructional Projects
Each constructional project is given a rating to guide readers as to its complexity.
Beginner: A project that can be tackled by a beginner who is able to identify components and handle a soldering iron fairly competently.
Intermediate: A fair degree of experience in building electronic or radio projects is assumed, but only basic test equipment is needed to complete any tests and adjustments.
Advanced: A project likely to appeal to an experienced constructor and often requiring access to workshop facilities and test equipment for construction, testing and alignment. Definitely not recommended for a beginner to tackle on their own.

Components for our projects are usually available from advertisers. For more difficult items a source will be suggested in the article. The printed circuit boards are available, mail order, from the Post Sales Department.

Mail Order
All PW services are available Mail Order, either by post or using the 24hr Mail Order Hotline (0202) 685952. Payment should be by cheque (overseas orders must be drawn on a London Clearing Bank). Access, Mastercard or Visa please.
Dear Sir

Hooray for Patrick Allely GW3KJW! I enjoyed reading his article 'Plain Speaking' in the November PW. I too cannot abide the 'Radioese' brigade's operating style.

How about full phonetics on a BBC quality f.m. v.h.f. band, nicely topped off with 'stroke mobile'. I reserve stroking for the cat!

Many thanks for striking a blow for the plain language group.

I'm still chuckling.

David Ginsberg G0JGX

Kendal

Cumbria

Editor's reply: Patrick Allely's article certainly stirred up a lot of comment from readers, in support and against his stance for plain speaking. Personally, I support his feelings, although my wife thinks I'm often guilty myself, even when talking to non-radio enthusiasts!

Dear Sir

According to Practical Wireless, if I have a subscription, then I will know all about PW Subscribers Club. Well to put it briefly, I have and I don't!

Since sending my remittance back in April I have certainly received PW by post, but nothing else. Have I missed out on something which may have been sent but not received?

I await your comments with interest.

C. W. Trippett

East Looe

Cornwall

Editor's reply: Thank you for your letter Mr Trippett. The PW Subscribers' Club is in the magazine every month, and it can be found under the 'regular articles' section, and subscribers (you're automatically a member of the club) can take advantage of the special offers available to them.

Dear Sir

Your 'Keylines' in the November PW, was read with great interest regarding the lack of a powerful voice in amateur radio.

Personally I couldn't agree more. As Public Relations officer for the Barnsley & District Amateur Radio Club I have worked with the club to broaden the image that amateur radio should project.

The club has had airtime on BBC Radio Sheffield and articles in the local press. For years I have been saying that the amateur radio fraternity have been selling themselves short.

Unfortunately, a great number of radio amateurs shut themselves up in a little room and cut themselves off from the world at large as if they are ashamed of what they do. We certainly need a more powerful voice than mine, such as MPs and the like whom I regret know very little about our hobby.

Of course, we could educate them so that we would be on a level like American amateur radio. They have Senators and Congressmen and women who hold call signs. They also do a good job.

If we could educate the media on the same basis then things will happen. We have to think positively. It's not what we can take ourselves up in a little room and cut ourselves off from the world at large as if they are ashamed of what they do. We certainly need a more powerful voice than mine, such as MPs and the like whom I regret know very little about our hobby.

Clive Hardy G4SLU

Parkstone

Poole

Editor's reply: Thank you for your letter Clive, and I hope that your little postscript will encourage other people that they can also learn a foreign language.

Dear Sir

You may be interested to know how things worked out on my visit to France, shortly after submitting the review article about the 'Accelerated Learning French' language course I wrote for the November PW.

Although I had not completed the course, what I had learnt was very helpful. My first major conversation in French, booking a hotel room, was almost a re-run of the first lesson of the course.

I discovered that the local French people understood most of what I was saying, and I was even complimented on my accent! Because of this, I really believe the course has provided a good basis to learning French.

J. Caledon-Scott G4LRS

Barnsley

South Yorks

Dear Sir

It has been particularly pleasing to learn recently of contacts on 10GHz by novices. They are to be congratulated on some very fine results.

Any means of helping others - and not just novices - to operate on the microwave bands is to be encouraged.

Of all the higher bands it's probably easiest to get started with wideband gear on 10GHz. The only difficult area is likely to be that of ensuring that transmissions are within the permitted frequency limits.

As in so many areas, the biggest problem of all lies in taking the first steps. So what can be done? Two sources of help spring to mind. Firstly, Practical Wireless could produce articles for beginners on the construction and operation of simple wide-band 10GHz gear. Secondly, experienced amateurs and radio clubs could help with frequency measurements, advice and, above all encouragement.

Pat Walker G8HMG

Redhill, Surrey

Editor's reply: I'm in complete agreement with you Pat, and I'm hoping that we can do something on microwave operating fairly soon. It would be very helpful if other interested readers could write to me on this subject.

Dear Sir

The views expressed in letters are not necessarily those of the Editor or Practical Wireless. We reserve the right to edit or shorten any letter. Vouchers will be sent to the Star Letter author. The views expressed in letters are not necessarily those of the Editor or Practical Wireless. All other letters will receive a £5 voucher.

Send your letters to the editorial offices in Poole. They must be original, and not duplicated in any other magazine. We reserve the right to edit or shorten any letter. The views expressed in letters are not necessarily those of Practical Wireless. All other letters will receive a £5 voucher.
Dear Sir

It was with some considerable interest that I read D. J. Burton G0SFV's letter in November's PW regarding the mix-up in the issue of his class A licence. As the licence holder of GORSR, I must tell you of our experiences in getting that callsign.

In February of this year, we applied to the RALU at Chesterfield for the callsign GORSR, for use by our Scout Group. We were told it would probably be three months before the licence would arrive. Then SSL took over the issuing of Amateur Radio licences from April 1, and the call was eventually issued to us in May. We were even on the air for HF NFD in June signing GORSR/P.

I noticed at the time, but did not pay attention to it, the fact that the licence validation document was handwritten, but correctly showed all the appropriate information. At the beginning of July, I received a second validation document from SSL, this time it had all the relevant information automatically printed. However, for some reason the station address (our Scout HQ) had been changed to that of the mailing address (my own address). I wrote back to them with the correct station address and waited.

At the beginning of September, a third validation document arrived, this time with the same information as the second document but with the postcodes changed! I immediately telephoned SSL, and they corrected the details over the telephone. I was informed that a new document would be dispatched the following day. It has still to arrive.

So, G0SFV, I am afraid that you are not the only one who has had problems with SSL. I would not be surprised if there were dozens more. It must be terribly distressing to have your identity taken away from you, for that is just what a callsign is.

I sympathise and send my sincere wishes to you, and I do hope that SSL reimburse you for your losses. Meanwhile, any personalised GORSR material would be welcomed by our group.

Peter Swynford
G0/PUB
Reading
Berkshire

Editor's comment:
Thank you for your letter Peter. I also hope (for the sake of our hobby) that SSL's all-too-obvious problems are sorted out soon.

David Moore G1VJL

Following the tragic death of David Moore G1VJL on 27 June 1992 at Woodford Air Show, we recently received a letter from his wife, Deanna Moore, with a little information on David.

David joined the Fleet Air Arm in 1968 and was a serving officer during which time he was in 360 RH/RAF Squadron at RAF Wattion and 803 Squadron in Ark Royal. When he left the service about 14 years later, he did some air taxi work and then joined Rolls Royce and was flying with them until his unfortunate death at Woodford, whilst flying the Spitfire. He flew in exhibitions around the world and also did about 10 to 15 air displays in the spitfire.

He was a gentle and kind man, who is greatly missed by friends and family, especially Deanna and their two children, Daniel 17 years and Melissa 14 years.

Enquiries regarding the following equipment to Deanna Moore, Old White Hart, Downend, Horsley, Gloucestershire GL6 0PF. Tel: (0453) 833584.

COMPETITION CORNER
Spot The Difference

Keeping warm in the shack during winter need not be a problem!

Mark the 12 changes made to this version of the cartoon. See below for details of entry to this month's Competition Corner.

First Prize
A year's subscription to Practical Wireless or a £20 book voucher.

Second Prize
Six month subscription or £10 book voucher

Name..............................................................................................................................................................
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Subscription Subscription Voucher

Send your entry (photocopies acceptable with coupon) to: Competition Corner, Spot The Difference Competition, January '93, PW Publishing Ltd., Enefco House, The Quay, Poole, Dorset BH15 1PP. Editor's decision on the winner is final and no correspondence will be entered into. Entries to reach us by Friday 22 January 1993.

Practical Wireless, January 1993
Badger's In Business

John Badger G4YVO, of 'Badger Boards' fame, has made a good recovery from a heart attack he suffered at the Harlaxton Manor rally in May. As usual, John is busy with his kit-supplying business and in training people in amateur radio and slow Morse practice. Regarding Morse, John plans to be on air again soon with c.w. on 144MHz for an hour around 10pm until 11pm (local time). The evening classes John is associated with are held at Perry Common School, College Road, Birmingham. John reports that he now has the service of the school for both the RAE and the Novice examination.

Currently, there are 35 people attending the RAE classes and eight in the electronics building class and seven in the Morse class. There's also the chance of Novice Classes, and John would appreciate if prospective pupils for any of the classes could contact him as soon as possible at 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF.

Tel: 021-363 9326.

Winter 1992/1993 Catalogue


As before, this edition includes many new products. With 23 product sections, 192 pages and over 3000 lines, the catalogue also includes the usual discount vouchers, and is available from most larger newsagents or directly from Cirkit Distribution Ltd., Park Lane, Broxbourne, Hertfordshire EN10 7NQ.

Tel: Sales (0992) 444111, Enquiries (0992) 441306.

Nottingham RAE Course

A special short RAE course is to be held at the Arnold & Carlton College, Digby Avenue, Nottingham. The course starts on Thursday 7 January 1993. There will be 16 weekly meetings, each on Thursdays, 6.30 to 9.15pm, with the objective of taking the RAE in May 1993.

The course is intended for students with some basic knowledge of radio. It should be ideal for Novices wishing to obtain a full licence and also as a revision course for those already aiming to sit the RAE in May.

Further information can be obtained from the course tutor, Alan Lake G4DVW on (0602) 382509.

Amateur Radio Programme On WWCR

The American short wave broadcasting station World Wide Christian Radio, based in Nashville, Tennessee, has recently introduced an amateur radio programme. The new programme, Radio Techniques is hosted by Howard Weinstein K3HW and Bill Quin KA2VUE.

The programme covers amateur radio from the north American perspective, and it's broadcast weekly. Radio Techniques can be heard at 2200UTC on Sundays and at 0600UTC on Tuesdays. Frequencies to listen out on include: 12.160 and 17.525MHz (2200UTC) and 7.395MHz (0500-1100UTC). Full details on WWCR's schedule and program can be obtained from them at World Wide Christian Radio, 1300 WWCR Avenue, Nashville, Tennessee, TN 37218.

EI Activity Day

Following the success of the EI Activity Day held on March 17 last, the Irish Radio Transmitters Society have decided to promote a second EI Activity Day in 1992 to give amateurs and short wave listeners world-wide another chance to qualify for the IRTS Diamond Jubilee Award.

The date set is Sunday December 27 and all EI counties should be active on that day.

The Diamond Jubilee Award is being issued to mark the Diamond Jubilee of the IRTS, which was founded 60 years ago in 1932.

It is available to amateurs who work at least 20 of the 26 EI counties during 1992 (s.w.i.s on a heard basis), on any band, any mode, (no endorsements).

QSL cards are not required, send a log extract verified by two amateurs together with IR E3 (or equivalent), to Diamond Jubilee Award Manager, IRTS, PO Box 462, Dublin 9.

The latest date for receipt of applications is 1 April 1993.

Practical Wireless, January 1993

Accelerate Your Learning

The latest research from Harvard University suggests that we each have, not one fixed IQ, but seven different types of intelligence. It gives a clue as to why some people currently do better at school than others - but why we could all do better.

Some people are more visual learners, some prefer to hear what they are learning, and others need ways to get physically involved to gain true understanding. And we each have their own individual combination of different types of intelligence. All these variations add up to many different learning styles. It's not brain power we lack, it's the techniques to use our own particular brain to the full.

Different people need different approaches if they are to learn well. Accelerated Learning Systems has spent four years refining a learn-to-learn programme called Accelerate Your Learning.

Accelerate Your Learning enables people to explore and develop their own learning style. Learning how to learn is a fundamental skill. What you learn can become outdated - how to learn is a skill for life.

An Action Handbook and Audio Tape let users discover what type of learner they are and then develop a systematic plan of action for learning in the way that suits them best.

The premise is that when you learn the way your brain works best, learning becomes more natural, more enjoyable and, therefore, quicker. That's why it's called Accelerated Learning. It helps people develop more of their true potential.

RAE Class

Midland ARS have RAE classes each Wednesday, 7.30 to 9.30pm. Classes are £2 each, which includes tea and coffee. John Badger is the class instructor. Further details from G6DRN on 021-443 1189 or G4OMP on 021-382 3606.

The basic programme creates the ability and motivation to learn well. A Super Skills Supplement builds on that ability and confidence, giving practical techniques for reading and absorbing information faster, improving writing skills, remembering better, studying more effectively and getting better exam results.

Finally, an Action Video demonstrates how all the techniques work in practice, from GCSEs, 'A' levels and further education programmes, to learning complex new skills at work. It also shows how to adapt the techniques and methods to help younger children learn more efficiently.

Who can benefit from such a programme? Obviously, students in secondary education, anyone taking evening classes or trying to gain a new skill or parents who want to be better equipped to help their child to learn.

It is also an important programme for any adult involved in training, re-training, or returning to work. (An Accelerated Learning Language Course was reviewed in November '92 PW)

Accelerate Your Learning is a comprehensive package at an affordable price of £25.95 (plus p&p).

Available from:
Accelerated Learning Systems Ltd.
50 Aylesbury Road
Aston Clinton
Aylesbury
Bucks.
HP22 5AH.
Tel: (0296) 631177.
FAX (0296) 631074.

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Practical Wireless, January 1993
Low-Cost Full-Featured Frequency Measurement To 1.3GHz

The SAJE SC-130 and SC-40 are full featured (microprocessor based) hand-held frequency counters providing portable high performance at a reasonable price.

The design incorporates an angle mounted 16x1 liquid crystal display, giving excellent readability from a wide viewing area, whether in hand-held or bench applications.

Operation of the instruments is straightforward. Annunciators are displayed to assist in defining and editing setup and measurement criteria. A battery condition indicator gives readout of the battery condition.

Both instruments provide a full range of features including measurement of frequency, period, count and RPM with a unique view facility enabling Min, Max, Average and Difference readings to be displayed. In frequency mode, a range of gating rates from 0.15 to 10 seconds is provided, plus a switchable low-pass filter. A display hold function is standard.

The SC-130 offers a frequency range of 5Hz to 1.3GHz and the SC-40 from 5Hz to 400MHz. Both instruments provide good sensitivity and high accuracy.

The instruments are housed in rugged ABS cases with a separate battery compartment for a PP3 size battery.

The size of the instrument is 165mm(l)x87mm(w)x38 mm(d) and weighs only 250g.

The instruction book provided is concisely written and ensures easy understanding of the counters and all features.

The SC-130 is priced at £109.00 plus VAT and the SC-40 at £89.00 plus VAT.

The SC-130 and SC-40 are designed and manufactured in the UK by SAJE Electronics.

For further information, please contact: SAJE Electronics 117 Lovell Road Cambridge CB4 2QW. Tel: (0223) 425440. FAX (0223) 424711.

Essex Amateur Radio Services Ltd.

When it comes to the crunch, the boys at Essex Amateur Radio Services Ltd. (EARS) have got their act together. Formed by David G3RCQ who buys and sells used amateur radio equipment, EARS is a new company, with a fully-equipped in-house service department, run by Bob G6AKL.

Bob has been involved with the repair and service of all amateur and p.m.r. equipment for the past 16 years.

The staff have, between them, 61 years of experience in the hobby. The company can supply and service new and used amateur radio, p.m.r., CB and scanning equipment. They can be contacted on (0708) 374043 or (0850) 320134.
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Practical Wireless, January 1993

Can You Help?

I am writing regarding the theft of a Kenwood TS430S set from a car park at Wickenham, Kent. The equipment was stolen on the night of August 1. The owner of the equipment is Martin Duvehand PA3EHV. Anybody with any information regarding the theft of a Kenwood TS430S itself. The name 'Multi-stamped on to the chassis E1715E03. The number 25997 is used? Charles Trippett, 'Blue unit and in particular, how it is used? Barbican, East Looe, Cornwall PL13 11S. Tel: (0503) 263495.

I am a civilian signals instructor at the TA 1618 Squadron, Air Training Corps, in Ipswich. We have recently acquired a PYe Marine CAT receiver, both ship and shore version. Please write to Stephen Harding, Sony Broadcast Amateur Radio Club, Sony Broadcast & Communications Ltd., Jays Close, Basingstoke, Hampshire RG22 4SB. Tel: (0256) 483454.

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BRIAN GW8 OKR
**Cheshire**

Steckport RS. 2nd & 4th Wednesdays, 7.45pm. Room 14, Dialstine Centre, Usborne Lane, Offerton, Stockport, Cheshire. December 16 - Christmas Party, January 13 - Meteorology by D. Jones G4DRJ. Jim France G3KAF on (0161) 4952.

**Clwyd**

Delyn RC. Every other Tuesday, 8pm. Gwirymynnd Community Centre, Gnervynymyd, near Mold, Clwyd, North Wales. December 15 - Mince Pie night. Steve Studdart GW7AAN on (0244) 81618.

Rhyl & DARC. 1st & 3rd Mondays, 8pm. WIRVS Centre, 116 Vale Road, Rhyll. December 14 - Social evening, 21st - Hot Pot Supper. Ken Padley GW7JAB on (01444) 382276.

Wrexham ARS. Maesgwyn Community Centre, Maesgwyn Road, Wrexham. December 15 - Christmas Buffet. Ian Wright GW1MLW on (01972) 405288.

**Cornwall**

Cornish RAC. Village Hall, Perranwell Station, Perranwell, nr. Truro. 30th December 14 - Computer Section, January 7 - Beating Around Africa by Peter GSWKP, 11th - Computer Section, 12th - Activities night. Geoff Bate on (0209) 820836.

**Derbyshire**

Buxton Radio Amateurs. Lee Wood Hotel, Buxton, 8pm. December 22 - Social evening. Derek Carson G41H0 on (01298) 820836.

**Essex**

Braintree & DARS. 1st & 3rd Mondays, 8pm. Community Centre, Victoria Street, Braintree. December 21 - Cheese & Wine Party, January 4 - G7EIG talk/video on work of the Trinity House lighthouse tenders. Eddy Scherer, 21 Maysey Avenue, Braintree. Essex CM7 5TZ.

Dengie Hundred ARS. 1st & 3rd Mondays. Henry Samuel Hull, Stopeley Road, Mayland, Essex. December 21 - Quiz night with local radio clubs. Tracey on (0285) 821585 after 6pm.

**Greater London**

Crystal Palace & DARC, 3rd Mondays, 8pm. Christ Church Centre, Kennington, SE11 (opposite junction Grange Road). December 19 - Christmas social. Marino Feranti G4HMU on (0181) 653599.

Edgware & DARS. Watling Centenary Centre, 145 Orange Hill Road, Burnt Oak, 8pm. December 10 - Quiz night with local radio clubs. Tracey on (0285) 821585 after 6pm.

**Hampshire**

Basingstoke ARS. 1st Mondays, 7.30pm. Forest Ring Community Centre, Sycamore Way, Winklesbury, Basingstoke, December 17 - 144MHz 'The Turkey Setter' festhux. OS185, Fox Alan G8FHM. (0256) 25517.

Horndean & DARC. 1st Thursdays, 7.30pm. Horndean Community School, Bampton Close (off Catherington Road), Horndean, Hants. January 7 - The Portsmouth Repeaters G3PJC, John Lewis JEMI, Stuart Swain GGIYX on (0705) 472846.

Ickenham Valley RC. 2nd & 4th Fridays, 7.30pm. Scout Hut, Brickfield Lane, Chandlers Ford. December 11 - Christmas Party. Maurice Cheeseeman G1PQD on (0730) 736784.

The Submarine ARS. Thursdays, 7.30pm. HMS Dolphin, Gosport, Hants. Mr. Talbot G3ESE on (0730) 898687.

The Three Counties ARS. Every other Wednesday, 8pm. Railway Hotel, Liphook, Hampshire. December 16 - Quiz night. Kevin Roche G4GGS on (0420) 830691.

Woodpecker RG, Mondays, 8.30pm. Richmond Place Club, Edgar Street, Hereford. Chris on (0432) 352441.

**Hertfordshire**

Dacorum AR & TS. 1st (informal) & 3rd (formal) Tuesdays, 8pm. The Heath Park Hotel, Cottrell Park, Hemel Hempstead. December 15 - Christmas Dinner. Dennis Boast G1AXX on (0442) 295620.


Verulam ARC. 2nd & 4th Tuesdays, 7.30pm. RAF Association Headquarters, New Kent Road (off Malborough Road), St. Albans, Hertfordshire. 2nd Tuesdays - activity evenings & 4th Tuesdays - main monthly meetings. December 13 - Christmas rally details in 'Radio Diary'. 15th - AGM. Walter Craine G3MPF, 5 The Crescent, Abbots Langley, Watford, Hertfordshire WD5 0DR.
Kent

East Kent RS. 1st & 3rd Thursdays, 7pm. Parkside Youth Centre in Herne Bay. Matthew Gainsford ZE1AW on (0227) 174714.

Maidstone YMCA ARS. Fridays, 8pm. YMCA Sports Centre, Melfrose Close, Maidstone. December 11 - Christmas Social. RAE, Colin Roberts on (0222) 670436.

Nottinghamshire

Mansfield ARS. Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. January 7 - Chairman's evening - talk & slide show by Mick G0EXH. Mary G0NZ on (0263) 752988.

Nottingham ARS. Thursdays, 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham. December 10 - Quiz, 17th - Christmas Social, January 7 - How To Deal With EM Emergencies by Andy G3FZL; 6m ; British Red Cross, 14th - Morse & The Morse Test by Ron G4ZLU. Ian Millar G4JAE on (0263) 225094.

South Notts ARS. Highbank Community Centre, Barnsford Road, Clifton, Easton, Nottingham, or Farham Community College, Farmborough Road, Clifton Estate. December 11 - Construction, 18th - on air, 20th - Christmas Dinner, January 8 - Talk - Paddle Keys International by Mr Crouhurst G4ZPY. Eric Eastwood G1WCD on (0762) 866790.

Lincolnshire

Grantham RC. 1st & 3rd Tuesdays, 8pm. Kansas Sports & Social Club, Barrowby Road, Grantham. December 5 - HF Antennas by John G3V5X; John Kirton GW4WJJ on (0476) 65743.

Spalding & DARS. Fridays, 8pm. The Riverside Centre, The Old Fire Station, Double Street, Spalding, Lincolnshire. December 11 - Fitting RF Connectors G3XDA, January 8 - AGM. David Johnson on (0170) 826376 (6-7pm).

Merseyside

Liverpool & DARS. Tuesdays, 8pm. Churchill Club, Church Road, Wavertree, Liverpool. December 15 - RSGB, G3AVJ, 22nd - 6Y0B, 29th - Open night, January 5 - The History Of Liverpool by G4CVZ/NARS.A arrangements, 12th - Activity night. Ian Munt GW4WX on 051-722 1178.

Wirral & DARC. Irby Cricket Club, Mill Hill Road, Irby, Wirral, 8pm. December 18 - D&W The Anchor, Irby, January 6 - O&W The Greave, Greasby, 12th - AGM. Paul Robinson G0JZP on 051-648 5892.

Mid Glamorgan

Nelson & DARS. Tuesdays, 7pm. The Basement, rear of the Salvation Army building, Perrott Street, Treherriais. Leighton Smart GW0BL on (0443) 411376.

Norfolk


North Yorkshire

Hamblton ARS. West House, Allertonshire School, Northallerton on 7.30pm. Nigel Robertshaw G0NHM on (0609) 776408.

Suffolk

Sudbury & DARC. 1st Tuesdays, 8pm. Five Bells Inn, Great Cornard, Sudbury. Nigel Robertshaw G0NHM on (0771) 770104.

Surrey

Surrey RCC. Thursdays, 7.30pm. Sutton United Football Club, The Borough Sports Grounds, Gander Green Lane, Sutton, Surrey. Natter nights - 1st Thursdays, December 17 - Christmas Buffet & Get-together, January 5 - committee meeting, 7th natten night - 10th - 3.5MHz AFS Contest (CW), John Puttick G0BWW, 53 Alexandra Avenue, Sutton SM1 2PA.

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11 Element Beam for 20, 17, 15, 12, 10m.

**MIRAGE/KLM COMMUNICATIONS EQUIPMENT**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>40M-2</td>
<td>40m 2 element Beam</td>
</tr>
<tr>
<td>20M-4</td>
<td>20m 4 element Beam</td>
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<tr>
<td>15M-4</td>
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<td>10m 4 element Beam</td>
</tr>
<tr>
<td>KT34-A</td>
<td>20-15-10m 4 element Beam</td>
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<tr>
<td>KT34-XA</td>
<td>20-15-10m 5 element Beam</td>
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<tr>
<td>6M-7LD</td>
<td>6m 7 element Beam</td>
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<td>6M-5</td>
<td>6m 5 element Beam</td>
</tr>
<tr>
<td>2M-20LBX</td>
<td>2m 20 element Beam</td>
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<tr>
<td>2M-11X</td>
<td>2m 11 element X Oscar</td>
</tr>
<tr>
<td>2M-14C</td>
<td>2m 7 element X Oscar</td>
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<tr>
<td>432-30LBX</td>
<td>70cm 30 element Beam</td>
</tr>
<tr>
<td>432-20LBX</td>
<td>70cm 20 element Beam</td>
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<tr>
<td>435-40CX</td>
<td>70cm 20 element X Oscar</td>
</tr>
<tr>
<td>435-18C</td>
<td>70cm 9 element X Oscar</td>
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**LINEAR AMPLIFIERS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>A1015G</td>
<td>6m 10-150w gif rx</td>
</tr>
<tr>
<td>B3030N</td>
<td>2m 30-300w g/f rx</td>
</tr>
<tr>
<td>B1016G</td>
<td>2m 10-160w g/f rx</td>
</tr>
<tr>
<td>B108G</td>
<td>2m 10-80w g/f rx</td>
</tr>
<tr>
<td>B215G</td>
<td>2m 2-150w g/f rx</td>
</tr>
<tr>
<td>D3030N</td>
<td>70cm 30w -100w</td>
</tr>
<tr>
<td>D1010N</td>
<td>70cm 10w -100w</td>
</tr>
<tr>
<td>D15N</td>
<td>70cm 2w -20w</td>
</tr>
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**GASFET PRE-AMPLIFIERS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>KP-1/2M</td>
<td>2m Indoor unit</td>
</tr>
<tr>
<td>KP-1/70</td>
<td>15m 4 element Indoor Beam</td>
</tr>
<tr>
<td>KP-2/2M</td>
<td>2m Masthead unit</td>
</tr>
<tr>
<td>KP-2/70</td>
<td>70cm Masthead unit</td>
</tr>
</tbody>
</table>

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**TELEX**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>7-2</td>
<td>40m 2 element Beam</td>
</tr>
<tr>
<td>7-7</td>
<td>40m Rotatable Dipole</td>
</tr>
<tr>
<td>205CA</td>
<td>2m 5 element Beam</td>
</tr>
<tr>
<td>204 BAS</td>
<td>2m 4 element Beam</td>
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<tr>
<td>203 BAS</td>
<td>2m 3 element Beam</td>
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<td>155CA</td>
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<td>15BAS</td>
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<tr>
<td>105BAS</td>
<td>10m 5 element Beam</td>
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<tr>
<td>TH7DXB</td>
<td>20-15-10m 7 element Beam</td>
</tr>
<tr>
<td>TH5MK3</td>
<td>20-15-10m 5 element Beam</td>
</tr>
<tr>
<td>EXP14</td>
<td>20-15-10m 4 element Beam</td>
</tr>
<tr>
<td>THJRB</td>
<td>20-15-10m 3 element Beam</td>
</tr>
<tr>
<td>TH2MK3</td>
<td>20-15-10m 2 element Beam</td>
</tr>
<tr>
<td>DX15B</td>
<td>8 Band HF Vertical</td>
</tr>
<tr>
<td>12AVQB</td>
<td>20-15-10m Vertical</td>
</tr>
<tr>
<td>12VQQ</td>
<td>60-10m Vertical</td>
</tr>
<tr>
<td>18VS</td>
<td>80-10m Vertical</td>
</tr>
<tr>
<td>60DX</td>
<td>6m 6 element Beam</td>
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<tr>
<td>64DX</td>
<td>6m 4 element Beam</td>
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<tr>
<td>215DXT</td>
<td>2m 15 element Beam</td>
</tr>
<tr>
<td>216S</td>
<td>2m 16 element Beam</td>
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<tr>
<td>703DX</td>
<td>70cm 31 element Beam</td>
</tr>
<tr>
<td>7030S</td>
<td>70cm 15 element X Oscar</td>
</tr>
</tbody>
</table>

**ROTATORS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Windload</th>
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<tbody>
<tr>
<td>T2X</td>
<td>1.9m</td>
</tr>
<tr>
<td>HAM IV</td>
<td>4.9m</td>
</tr>
<tr>
<td>CD45 II</td>
<td>0.79m</td>
</tr>
<tr>
<td>AR40</td>
<td>0.28m</td>
</tr>
</tbody>
</table>

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- LR-1 2m Co-linear
- PB24M 70cm. 24EL. Beam
- PBM88 70cm. 88EL. Multibeam
- MBM48 70cm. 48EL. Multibeam
- D15-23 23cm. 15EL. Double

TONNA
- 20505 6m. 5EL. Beam
- 20817 2m. 17EL. Beam
- 20813 2m. 13EL. Beam
- 20818 2m. 9EL. ‘X’ Yagi
- 20909 70cm. 9EL. Beam
- 20438 70cm. 19EL. ‘X’ Yagi
- 20921 70cm. 21EL. Beam
- 20623 23cm. 23 EL. Beam
- 20655 23cm. 55EL. Beam

MET
- 50-5 6m. 5EL. Beam
- 50-3 6m. 3EL. Beam
- 50-2 6m. 2EL. Beam
- 70-5 4m. 5EL. Beam
- 70-3 4m. 3EL. Beam
- 144-14 2m. 14EL. Beam
- 144-7 2m. 7EL. Beam
- 432-5B 70cm. 5EL. Beam
- 432-17T 70cm. 17EL. Beam

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SPECIALIST ANTENNA SYSTEMS LTD
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Whenever possible I try not to miss an opportunity to try out any kit that is available. I'd come across Ramsey Kits before, but it was the first time I had seen this particular project.

**Adventurous Beginner**

Ramsey kits are aimed at what I would call an adventurous beginner. They come with full instructions that almost anyone who can identify components can put together. But, and here's the great bit, they are manufactured so that anyone with an ability to read a circuit diagram, and component values, can be successful.

The kit comes complete with a small (A5) sized, well-written booklet that contains the circuit diagram and circuit board overlay. Also included are hints and tips on good soldering and building methods, and step-by-step instructions on assembly.

Each step has its own space to tick, with a pen or pencil, when you've completed this step. You may say 'well I don't need that!'

Despite this the tick system could help you. This is because I've lost count of the number of times I've been disturbed during a project, then returned to the job and put the wrong component onto the p.c.b.

**Pleasant Assembly**

But enough of this rambling, what was the kit like to assemble? The short answer to that question is, pleasant. All the parts supplied, were all good quality components.

With the exception of one coil, I had no problems at all. However, the coil that I was less than happy about, was the first local oscillator (l.o.) coil. This is a narrow, tall former that seems to be less than mechanically stable on the board.

Mechanical stability is one of the worst causes of drift in v.h.f. oscillators. The problem oscillator coil was rather mobile on the p.c.b. It wasn't that it didn't fit, just that it had projections on the base that allowed it to move around.

The movement, coupled with what I considered to be an over-long former, could lead to instability in some cases. The second cause of oscillator drift is the variable capacity diode (varicap diode).

The capacitance of a varicap diode changes, not only with reverse voltage, but also with ambient temperature. To overcome these sources of instability, a small amount of automatic frequency control (a.f.c.) is applied to the first l.o. causing it to move back onto the right frequency if either the transmitter or the l.o. change frequency. This is the reason that the l.o. works on the high side of the input signal.

These days, with synthesised transmitters, there is little to worry about. But with this relatively simple l.o. there is a distinct chance of drift. Hence a very welcome a.f.c. loop.

The circuit can be described in simple terms. The receiver consists of a transistor r.f. amplifier (135-175MHz) following a very simple low-pass filter. This feeds an NE602 i.e. working as a mixer/oscillator (the oscillator is 10.7MHz higher than the wanted signal) followed by a simple transistor (10.7MHz) i.f. amplifier.

The latter stage feeds a MC3359 type mixer/oscillator f.m. demodulator chip. There is only the minimum of i.f. tuning necessary, as ceramic resonators are used throughout.

**Simple To Align**

It's a simple set to build, simple to align, and it's simple to work. I changed the tuning potentiometer for a multi-turn device to give easier frequency setting. The first l.o. coil was changed for a Toko S18 two and a half turn (red) with a ferrite core. This improved stability and made tuning slightly easier.

To change the overall frequency range would require a little more work. The two coils in the input low-pass filter and the l.o. coil would have to be changed to something more appropriate, and a little more experimentation would be required.

I could, with just a few modifications, make this the basis of a multi-band f.m. receiver.... I could also make it into a scanning receiver in any of those bands, stopping on any signal encountered... I could use it as the receiver side of a radio microphone that my son is asking for... I could use it on the output of my 1296MHz transverter to monitor the activity on that band.... The list is almost endless.

**Conclusions**

The Ramsey FR-146 kit is a good cheap starter receiver kit. It's reasonably sensitive and there are other kits available covering other bands. However, it is comparatively easy to change the received frequency of any of these kits. With a little thought and experimenting, it can be made to do many things, and become the basis of a system.

The Ramsey Kit FR-146, costing £26.95 plus £1.50 p&p, is available from Waters & Stanton of 22 Main Road, Hockley, Essex SS5 4QS.

Tel: (0702) 206835/204965.

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Practical Wireless, January 1993
**WHAT A GOOD IDEA**

**Tuned Traps**

This idea came about after one of the traps in my antenna became faulty. I had extreme difficulty finding, at a reasonable price, high voltage capacitors to make up a new trap. Looking through the junk box, an idea was triggered by the sight of double-sided p.c.b. material.

The idea, although not new, was to use this p.c.b. material as both capacitor and former for the coils forming the trap. A piece of double-sided p.c.b. material, some 62mm by 50mm, had a capacitance of about 70pF. Using two pieces in a cruciform arrangement, and with the copper trimmed back from all the edges, I thought that I should be able to get a suitable coil (about 4.5µH) to resonate on 7.05MHz.

**Almost Any Wire**

After some calculations I arrived at 11.5 turns of wire in a 50mm length. I had some 2.5mm diameter wire in the junk box which I used. You can use almost any wire with a thickness greater than about 1mm, but the thicker the better.

All that's really left is to tune the traps to 7.05MHz, using whatever method you find easiest. I use the method using a receiver, outlined in the ARRL Radio Handbook, as it's more accurate than using a g.d.o.

If the resonant frequency is too high, try squeezing the coil turns together. Or if too low in frequency, try carefully trimming a little more copper from one of the formers. Or spreading the coil turns a little more apart.

M. Schofield G4WUP
Broadstairs
Kent

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**Cheaper Battery Pack**

I, like many amateurs, own a Yaesu hand-held transceiver. These are fine until that fateful day you discover that the battery pack won't hold its charge any more. Faced with this problem, but unable to afford a new battery pack (FNB-10 7.2V 600mAh), I searched for a way out of my predicament.

Turning the problem over in my mind and the battery pack in my hand, I noticed that there are slots on the battery pack. Being inquisitive I inserted a small coin into one of these slots and twisted. With small popping sounds the spots of glue, holding both halves together, parted. Repeating this treatment on the other slot, I was amazed to find standard-size rechargeable cells inside.

Carefully extracting the cells and wiring, I replaced the cells with new ones. These new cells cost only about £1 each at rallies, and are cheap compared to the original component.

Finding a suitable glue to hold the two halves of the battery pack together was rather more difficult. In the end I settled for using black insulating tape wound around the case. It doesn't look very pretty, but as I use the hand-held in a soft pouch, who's to notice? And it was cheaper.

Harry Wagg G6RYM
Rock Ferry
Cheshire
The most important part of many items of test equipment used for measurements at r.f. is the diode voltmeter. It's used in s.w.r. meters, r.f. power meters and field strength meters to name but a few.

The diode voltmeter is simplicity itself, comprising a diode, resistor, capacitor and a d.c. meter. However, like many apparently simple things, there's more to it than meets the eye!

Field Strength Meter

The principle of the diode voltmeter is best shown by its use in the diode field strength meter (f.s.m.), as in Fig. 1. In practice, the diode f.s.m. comprises a tuned circuit followed by a diode voltmeter.

The voltmeter, under ideal circumstances, is able to measure half the peak-to-peak voltage of the r.f. waveform. This is developed across the tuned circuit when an r.f. signal is input to the antenna socket.

Three Aspects

There are three aspects of the diode voltmeter, which affects the way it measures an r.f. waveform. The first is the voltage/current characteristics of the diode.

During the non-conducting phase, the capacitor discharges through the resistor and the meter. Provided the time constant of the circuit is large, compared with the r.f. waveform frequency, then the degree of discharge will be small. The difference between the true peak value and the measured value will then be insignificant.

In my article "Experimenting With Beam Antennas In The Back Garden" (PW September), I described some experiments that could be done using v.h.f. models of h.f. beam antennas.

The most important item of test equipment used in the experiments was a diode f.s.m., similar to that shown in Fig. 1. It enabled me to measure the r.f. field strength on a meter as the antenna was rotated.

Reasonably Sensitive

A f.s.m. needs to be reasonably sensitive. It should also have a linear response, i.e. the d.c. voltmeter reading should be directly proportional to the r.f. peak-to-peak waveform. The current/voltage characteristic of the resistor is a straight line. This indicates that it's linear, i.e. the current through the resistor is proportional to the voltage across it, and Ohm's Law applies, i.e. \( I = \frac{V}{R} \).

Fig. 1: Circuit of a diode field strength meter or f.s.m. (see text).

Fig. 2: The current and voltage waveforms in the diode voltmeter, as they appear when measuring an r.f. signal.
However, in the direction of conduction, the characteristic of the diode is decidedly non-linear. This is particularly so when the voltage level is small.

In any practical application, the diode is in series with a resistive load, usually a meter. Under these circumstances the characteristic is a composite of the diode and resistive load, as in Fig. 3.

**Resistive Component**

As the resistive component is increased the steepness, or gradient, of the slope is reduced. This shows that the circuit is less sensitive.

You can now see that sensitivity and linearity of the f.s.m., is dependent on the resistance and sensitivity of the meter. A digital voltmeter (d.v.m.) is preferable in this application for two reasons. Reason number one, is that the higher input impedance of the digital meter results in a more linear and sensitive instrument. The other reason, is that the input impedance is the same for all d.v.m. ranges, so that the characteristics of the diode are not changed if the range is changed.

The observable resolution and range of the digital voltmeter is greater than the analogue type making it easier to record the test results.

**Germanium Diode**

Although the point contact germanium diode gives good linearity, provided the load resistance is high enough, it's difficult to find. Unfortunately, this type does not appear on the list of diodes in many manufacturers catalogues these days. For this reason I investigated the properties of other diodes.

I tried three different types of diode for a f.s.m. to be used at v.h.f. They were germanium, silicon (signal types) and Schottky barrier (the latter also sometimes known as hot carrier diode).

**Characteristics**

The illustration, Fig. 4, shows two sets of characteristics of the diode f.s.m. The first set of characteristics was produced using a 50μA (600mV) analogue meter. The second set was produced using a digital voltmeter as the field strength indicator.

The characteristics of a BAT85 diode, although not shown, are similar to that of the germanium diode.

**Construction Simple**

Constructing a diode f.s.m. is so simple, that providing construction notes seem superfluous. However, the following points may be of some help.

The size and shape of the enclosure, is unimportant, but it should be made of metal. This is to prevent r.f. energy from entering the tuned circuit, by any path other than the pick-up antenna.

The capacitor value is not critical. The f.s.m. I have in current use, employs a two-gang type (although I only use one gang) air-spaced variable.

The variable capacitor was of unknown capacity, removed from an old transistor receiver. It has a built-in slow-motion drive, which is an added bonus.

**Coil Dimensions**

The coil dimensions for the diode f.s.m., depends on the frequency range you want to cover. I make most measurements at v.h.f. (144-146MHz).

The inductor is 20mm in diameter and 15mm long. It comprises two turns (self supporting) of 18s.w.g. wire, with the antenna tapped one third of a turn from the earthed end.

I would suggest that you make coils of solid tinned copper wire where possible. This enables you to find the optimum tapping point for both the diode and the antenna connector, to get the greatest sensitivity.

It's worthwhile taking a little time finding the best tapping point. For example, the Schottky barrier signal diode BAT85 operates more efficiently in this circuit, if it's tapped well down the coil.

So, that's it for this time. I'm looking forward to doing regular antenna construction articles, and reviews of commercially-made antennas and related equipment.

I'll always be interested to hear what readers would like to see in PW. Your letters are always welcome and you can write to me at 37 The Ridings, East Preston, West Sussex BN16 2TW.
Badger Boards of Sutton Coldfield started, as the name suggests, as p.c.b. manufacturers. They have now branched out into supplying kits of all levels from simple audio oscillators to more complex ones, such as a spectrum analyser.

For more information, send an A6-sized s.a.e. to Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: 021-353 9326.

Brian Jordan G4EWJ is just starting out as a kit supplier, and he has every intention of being successful. As this list was being compiled, a well presented Morse tutor kit, Brian’s first, arrived on the editorial desk. This kit, with an impressive specification, is the first of a line of kits to be introduced by Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coldfield B74 4JF. Tel: 021-366 6928 or FAX (01121) 77427.

Cedar Electronics can support and supply spares for the Heathkit series of high quality educational kits. They may be contacted at 12 Isbourne Way, Broadway Road, Winchcombe, Cheltenham, Glos. GL45 5NS. Tel: (0242) 602402.

Cirkit Distribution Ltd. make their catalogue available through high street newsagents. Their winter 1992/93 catalogue has a large section on ‘Kits and Modules’. Many varied items may be found here, including antenna tuning units, r.f. power amplifiers and pre-amplifiers, along with h.f. transceivers. For more information and their catalogue, contact Cirkit Distribution Ltd. Park Lane, Broxbourne, Herts EN10 7NO. Tel: (0992) 444111 or FAX (0992) 464457.

C. M. Howes Communications supply kits of high quality, covering almost all aspects of the hobby. They can supply active antennas for both h.f. and v.h.f. / u. h.f. A variety of h.f. transceivers can be built up from the various kits on offer. If you like the idea of a kit, but are unable to build one, then the p.c.b. s can be supplied ready-built.

For more information, send an A6-sized s.a.e. to C. M. Howes Communications, Eydon, Daventry NN11 6PT.

Coltec Electronics produce a series of kits from oscillators to wavemeters, and iambic keyers to power supplies. All of the kits are contained in an A5-sized catalogue, which is available from them at 330 Brays Road, Sheldon, Birmingham B26 2PS. Tel: 021-722 2429 or 021-628 7839.

F. G. Rylands can supply plans only for many types of radio-related projects, although many of the plans concentrate on receiving loop antennas for various bands. For more information about the plans that can be supplied, contact F. G. Rylands, 39 Parkside Avenue, Millbrook, Southampton SO1 9AF. Tel: (0703) 775064.

Greenweld Electronics of Southampton, have been in the business of supplying components for many years. In their latest catalogue, which costs £2, there is a small section listing the kits available. Only a few of these kits are radio related, many of the kits are novelties, that might make simple presents.

For more information, contact Greenweld Electronics, 27 Park Road, Southampton SO1 3TB. Tel: (0703) 236363 or FAX (0703) 236307.

H. Corrigan can supply small radio related kits. Do you fancy fitting a beat frequency oscillator (b.f.o.) to your radio? If so, he may be able to supply one to suit. For more information, contact H. Corrigan, 7 York Street, Ayr KA8 8AR.

Hands Electronics are, at present, not large suppliers of kits, but they intend to change this before very long. They have assembled a good range of kits, covering receivers to test gear. They even have some kits suitable for valved projects.

Their catalogue is available from Hands Electronics, Tegryn, Llanfyrnach, Dyfed SA35 OBL. Tel: (0239) 77427.

J. A. B. Electronics Components are more normally noted for supplying components for projects, rather than kits. But all that is changing. In their comprehensive A4-sized catalogue, three pages are devoted to the various kits that they can supply. Most of the names found here, are well-known projects from PW and other magazines. Kits are being added to the list all the time.

For a copy of their catalogue, send £1.25 to JAB Electronic Components, 1180 Aldridge Road, Great Barr, Birmingham B44 8PB. Tel: 021-366 6928 or FAX 021-366 6237.
Jandek can be found at rallies throughout the year. Kits and components nestle side by side on their stall. The kits cover most of the sections of an h.f. transceiver. In fact, the various kits can be built up into a versatile QRP rig covering almost any h.f. band.

For their short-form catalogue, send a medium to large s.a.e. to Jandek, 6 Fellows Avenue, Kingswinford, West Midlands DY6 9ET.
Tel: (0384) 288900.

Kanga Products kits are well-known to all members of the G-QRP club. Dick Pascoe GOBPS, is extremely supportive of all of the ideas and circuits that have appeared in Sprat magazine. Kits such as ‘OXO’ and ‘Oner’ are of the simpler variety, but more complex kits are available. Send a medium s.a.e. to Kanga Products, 3 Limes Street, Folkestone, Kent CT19 4AU.
Tel: (0303) 276171.

Lake Electronics The Lake DTR series of c.w. transceivers, well-known by QRP operators and attendees of rallies, are available for the 1.8, 3.5 and 7MHz bands. These are not the only kits that can be supplied. These are not the only kits that can be supplied. They have a section devoted to the many kits they can supply. Among the kits are radio receivers, for short wave and v.h.f., and test oscillators. A shortened winter supplement, including a small section on kits, was available in the December '92 issue of PW.

For a copy of their full catalogue, contact Marco Trading, The Malting, High Street, Walsall, West Midlands. Tel: (0533) 777648/780891 or FAX (0533) 477551.

Marco Trading may be found at the larger rallies, with their stock spread over many tables. In their catalogue, they have a section devoted to the many kits they can supply. Among the kits are radio receivers, for short wave and v.h.f., and test oscillators. A shortened winter supplement, including a small section on kits, was available in the December '92 issue of PW.

For a copy of their full catalogue, contact Marco Trading, The Malting, High Street, Wem, Shrewsbury SY4 5EN. Tel: (0939) 232763 or FAX (0939) 233800.

Spectrum Communications Would you like to build your own transmitter or transverter? Spectrum Communications supply kits of parts to produce various transverters and linear amplifiers. These, and their range of pre-amplifiers, may be seen at their shop at 60 Park Street, Weymouth, Dorset. For a free catalogue, contact Spectrum Communications, Unit 4, Grove Trading Estate, Dorchester.
Tel: (0305) 262250.

Mainline Electronics are suppliers of almost any r.f. component you care to mention. They can also supply a series of kits, covering h.f. to microwaves. Do you fancy a (under-run of course) 1kW h.f. amplifier, or perhaps a 2.3GHz transverter? If so, Mainline have something for you in their catalogue.

For a copy of their A4-sized catalogue, contact Mainline Electronics, PO Box 235, Leicester LE2 9SH. Tel: (0533) 777648/780891 or FAX (0533) 477551.

Maplin Electronics catalogue is available, priced £2.95, through branches of W. H. Smith (£3.45 mail order) or from Maplin shops. A large section of this catalogue is given over to ‘Kits and Modules’, featuring illustrations and descriptions of the many kits they can supply.

For more details, contact Maplin Electronics, PO Box 3, Rayleigh, Essex SS6 8LR.

For a copy of their A4-sized catalogue, contact Marco Trading, The Malting, High Street, Wem, Shrewsbury SY4 5EN. Tel: (0533) 777648/780891 or FAX (0533) 477551.

Tandy This high street shop is better known for things electronic, computing or audio, rather than kits. But, they supply a range of electronic starter kits which may be used to make up electronic circuits and radios. These kits range in price, from about £5 to £35. Look in your local telephone book for the local Tandy shop. If you are unable to find your local Tandy store, contact InterTAN UK Ltd., Tandy Centre, Leamore Lane, Walsall, West Midlands.
Tel: (01972) 710000.

Waters & Stanton now supply Ramsey kits, which are a series of transceivers and receivers for h.f. and v.h.f. See this issue for a review of the Ramsey FR-146 receiver kit. The kits can be simple, as in the h.f. receivers, or more complex, as in the 144MHz synthesised transceiver kit reviewed in the January '92 issue of PW. Waters and Stanton, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (0702) 206835 or FAX (0702) 205843.

There are several books available to help the kit-builder. For example, if you're relatively new to the radio hobby, A Beginner's Guide To Modern Electronic Components, by the well-known author R. A. Penfold, could prove very useful indeed. Published by Babani, the book covers a wide range of modern components, their basic function and how to decipher colour codes and numbers. Importantly, for the beginner, it doesn't assume any knowledge of electronics. Available from the PW Book Service at £3.95 plus £1 p&p.

Another book of interest to both the relatively new and the more experienced constructor, is Practical Ideas For Radio Amateurs by Ian Poole G3YWX. Published by Argus Books, this useful little book is written by well known amateur radio author Ian Poole, packed with constructional ideas, tips, component identification, how to use components, circuits, testing, and general reference. Available from the PW Book Service for £4.50 plus £1 p&p (limited number only). Write to PW Publishing Ltd. FREEPOST, Enfield House, The Gasy, Poole, Dorset BH15 1PP.

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Standard CSB5 - This twinband handheld is the model others were based on. Still a proven winner amongst the new-lookers and recommended users alike. Full 100W coverage, 430-490MHz. 5 watts available when powered via 12V DC. £165.00

ALINCO CSB50 - 70 cm version of the CSB5. This model will be a proven winner amongst the new-lookers and recommended users alike. £175

SONY SHORTWAVE
As a Sony Shortwave centre, we stock a complete range of Sony Shortwave product. A selection of our best sellers...

SONY SW77 - One of the best new editions to the Sony range. The SW77 covers 150kHz-30MHz plus an additional 76-108MHz with a 40 character display. £175

SONY SW77 - This Twinband handheld the model others were based on. Still a proven winner amongst the new-lookers and recommended users alike. Full 100W coverage, 430-490MHz. 5 watts available when powered via 12V DC. £165.00

NEW HAND-HELD
ALAN CF-145 - Fully featured 2M handheld with options for SFTM & CTCSS Paging. 5 watts output is available when powered via external 12V DC supply. Now with extended reception - 130-160MHz. Excellent reliability & performance. £159.00

ALAN CF-450 - 70 cm version of the CF-145. This model will be a proven winner amongst the new-lookers and recommended users alike. Full 100W coverage, 430-490MHz. 5 watts available when powered via 12V DC. £165.00

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Japanese Fm Fine Wire Control Cable. Super low cost - essential for optimum performance with widespread UHF Transceivers and Receivers. Touch-weather resistant yet still remaining flexible. This range of radio is good for frequencies up to 30MHz.

Model 6D (6m.) £13.60 p/metre
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"N" type connectors for the above cables.

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Shorthaily available BNC's and PL259's to fit all.

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NEW VECRONTIONS AMP
Vector 500. "Canadian Punch" A full 1000 Watts PEP or SSB enables you to beat the piles. Now available here in the U.K. Top band to 100kHz & 60MHz output. £865

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We buy as well as sell new and used radio equipment, please feel free to call Paul or John on our Hotline for an instant quote on either P/X or Buy-ins.

Marc II Hipster receiver (500kHz-500kHz). All -board, v.g. £175

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Trio TR2200G 2 metre rock bottom price £75

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YAESU FT8900 Complete with receiving antenna and ATE... £425

YAESU CP2500C 2 metre FM Mobile. TX/RX c.w. matching PSU... £245

JRC 125 Superb HF TX/RX. Gen. coverage receiver. V.G. £675

M/M2. 2m transverter... £150

Drue Slow Scan TV unit with remote control... £195

NAMDAK1000 ATU. Very good condition... £99

Kenwood TS590S Considered the best H.F. TX/RX on the market... £1095

Kenwood T/L922 2M JPE P.H. Amplifier. Good condition... £995

THIS MONTH'S SPECIAL P/X DEAL
Get the very latest in H.F. transceivers by purchasing one of the following: TS930S, TS530S, TS540S, FT701, FT107, FT777, FT775, TS130S or any other models from that era.

Call us now - even if we haven't listed your radio, we'd love to know if it is unbeatable P/X deal.

VICTRONICS

VICTRONICS - Canadian based - producing High Quality affordable Amateur accessories including:

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VC300 - Good basic workhorse. 4:1. Varistor tuning 1300W. £190.00

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TCS150 - 13.150pF Variable 7.6k Capacitor. £28.00

TCS1700 - 1700pF Variable 7.6k Capacitor. £15.00

CT8C - 8 channel Coupler. £3.57

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BOXING IT UP

PART 2

Last month, I concentrated on working with plastics materials. This is because I consider that plastics are a very useful alternative nowadays. Despite this, metal boxes and cabinets are still very popular.

Suitable metals are mild steel sheet or aluminium sheet. Both can be obtained quite cheaply as off-cuts either directly from metal-working companies, or local scrap dealers.

Be careful when buying, not to buy too thick a material. The metal may be sold by weight and it could end up being more difficult to work.

STAINLESS STEEL

Take my advice, and look out for metals such as stainless steel. They look fine until you come to work them, and then you realise their shortcomings for the home-constructor.

Material thicknesses of 0.75mm or 1mm will be adequate for most things you want to do. Metals of around this gauge should come reasonably cheaply.

When you get the metal, don’t worry that if it seems very flexible as a sheet. Once it has been folded up, it becomes rigid and strong.

WORDS OF CAUTION

I’ve got a few words of caution, before telling you how to start the business of making things. Take heed, because you could avoid a lot of cuts and scratches!

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When you buy your sheet metal, it’s highly likely that it will have been cut with a power guillotine or press. This action can leave it with very sharp edges.

Small cuts are a source of irritation, and they take a while to heal and not always cleanly. This is because steel in particular is often coated with protective chemicals, to stop corrosion.

So, before you start work, clean the metal by using old newspapers, which are particularly effective. Aluminium sheet may have a thin sheet of plastics similar to cling film on it, to protect the surface. It’s best to leave it on, as it forms a useful surface for marking out.

Editorial note: Readers who do try working with sheet metal are asked to follow G4JGS’s safety tips as closely as possible. My own advice is that a pair of strong gardening gloves (available from hardware shops) are used when handling or cutting the metals. Don’t forget that most of us are working alone in the workshop, and help may not be immediately available if unnecessary accidents occur!

MARKING OUT

Traditionally, marking out on metal is done using a dye called Engineer’s Blue. In use, it’s spread as a thin film of blue liquid all over the metal. After it’s dried, the ‘blue’ is scratched away with a sharp scriber, to reveal a sharp silver line on a blue ground.

Using the ‘blue’ is okay, if you want to go in for precision metal-working. But for the average home constructor a sharp HB pencil will do.

Fine felt-tip pens of the permanent-marking variety are an alternative, and you can get away with water-based pens sometimes. Raid the children’s pencil case and try them out!

If you fancy using a scriber, but not the messy blue, try using a thick felt-tip pen filled with permanent ink. When it’s dry, scratch through the film using the scriber.

The felt-tip pen idea works very well, and it’s less messy. If you go wrong, you can clean the ink off with surgical spirit and cotton wool and try again.

AMBIDENT SHAPES

If you’re feeling very ambitious, you can create all sorts of shapes in metal just like you can in plastics. But for ease of construction, the ‘double U’ method is the best shape.

With this method you make two shapes which interlock to form a closed box. Then with tabs put onto one ‘U’, you can drill through both, using self-tapping screws to hold the assembly together.

As I recommended when using plastics, I suggest you get some card and make a simple model. This way, you can easily find out exactly what shape and size you want.

METAL TO PLASTICS

The order of construction is different when you’re using metal to plastics. When working metal, all the holes, cut-outs, etc., must be done while it’s still in a flat sheet form.

Because of the marking-out process, working with metal becomes a little bit more critical. This is because it’s easy to overlook something. Mistakes can be rectified later, but it’s more difficult (compared to the plastics method) because metal is a harder material to work.

Cutting to shape is best done with a pair of tin-snips. These are used like a large pair of scissors. If you have difficulty in holding the tin-snips in your hand, clamp one arm of the snips in a vice. With this method, you can use your body weight, rather than the strength of your hands.

Don’t try to cut right into corners, you’ll always overdo it. Cut as close as you can, and then remove the metal by flexing it up and down until it breaks off. The little piece of rough metal can then be cleaned out with a file.

When drilling metal it helps if you mark the centre of the hole. Traditionalists will insist on a centre-punch, but a sharp nail, etc., or anything that leaves a sufficiently deep mark on the surface of the metal, to help the drill start, will do.

When drilling, watch out as the drill breaks through. The bit can snatch, and try to pull the metal right up the shank of the drill.

So, when drilling, hold the job firmly in a vice or something similar. Whatever you do, don’t hold it with your hands.

Even when the drill breaks through the metal cleanly, it will leave a small raised area around the hole. The raised area should be...
In the second and final part of his very practical approach at making boxes and enclosures for radio use, Stephen Harding G4JGS takes a look at working with metal.

Once all the holes have been made, the next stage is to fold the box to shape. The best way of doing this, is to use some form of firm clamping device.

A bench vice is ideal for holding the job, but it’s rarely the right size. To extend the vice, two pieces of angle-iron or fairly substantial angled aluminium are ideal.

Skip the angle-iron or aluminium extenders into the jaws of a vice, leaving a small gap. You can then place the metal sheet between them, so that you can just see the line you want to fold on.

Next, clamp the vice up tight. If you haven't got a vice, you can use anything which will grip firmly. Self-gripping wrenches (Mole Grips or 'O' clamps are suitable).

You can also drill a couple of holes at the ends of the angle pieces. Then you can thread a nut and bolt through, and this will provide a firm bending jig when bolted to the bench.

To start the bending process, fold the metal progressively over until it is at the right angle. If you’re intending to make a right angle (90°) it’s best to go slightly over 90°, and bring it back later.

To get a really sharp fold, place a piece of wood along the fold line and hammer onto the wood. Don’t hammer directly onto the metal, and hammer onto the wood. Don’t forget to protect your hands from the sharp metal.

Once the shape is formed, place it on a flat surface to find out which way you’ll need to twist it, to get it to stand firm. Adjust the shape by twisting with your hands, and don’t forget to protect your hands from the sharp metal.

If you wish, there’s no reason why you shouldn’t form all of the shape that’s required over a piece of wood. Just make sure that you provide enough clearance to get it out!

If your marking-out isn’t accurate, it will show up and you can adjust it accordingly. Once all is to your satisfaction, the last thing to do, is to remove any sharp corners that you didn’t spot earlier.

It’s rather surprising, that when you alter the angle of the metal you find new sharp areas. Be careful, and remember, safety first!

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Great Temptation

Now you’ve got this far, there’s a great temptation to resist. It’s all too easy at this stage to install the circuit in the box, fit all the controls and get on and use it.

If you are tempted, at least the shack mouse will be safe. But your efforts won’t look as good as they should, and they won’t rival the black or grey commercial boxes.

So let’s resist the temptation, and finish the job off properly. To do this, there are several finishes that can be applied. The most obvious is the spray paint that’s sold for touching-up car paintwork.

The various touch-up paints are relatively cheap, are easy to apply and they look good. Their drawback is that they are not very scratch resistant unless heat treated, and for plastics this is out of the question.

For use on plastics, the touch-up paints also need a special etching primer which is expensive. So, we require something which is easy to apply, hard-wearing and attractive without needing any special preparation.

In my opinion, the best way of degreasing is to wipe the entire surface with surgical spirit or methylated spirits. Use a soft cloth, and keep turning it to find a clean area of material for maximum effect.

When you’ve cleaned the surface, it will require ‘keying’. One of the best materials for this, is a course steel wool pad.

If you come across any imperfections in the surface (join lines, hammer marks, etc.) now’s the time to get rid of them. You can do this by filling them with plastic filler, and when it has thoroughly cured, rubbing it down so it’s smooth.

Finally, wipe all the dust off with a clean tissue. Please try and resist the temptation to finger it revelling in its exotic smoothness. You’re leaving greasy finger marks all over the job, and they won’t help the paint to ‘ grip’ the surface!

Spray or Brush

Whether you spray or brush the paint on, is a matter of personal choice. The place where you do it needs to be well ventilated and dust free.

If you’re using the aerosol spray, paint, shake the can for a long time.

Preparation of the surface, is the key to getting a good finish. It must be thoroughly degreased, especially if it’s metal and any loose particles removed.

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If you’re using the aerosol spray, paint, shake the can for a long time.
Before you actually start painting, spread plenty of clean newspaper around and place your box on it. Put something inside it, so that the box is supported clear of the surface. By doing this you'll avoid having to peel newspaper off because the paint has stuck to it.

It's best to mask out the joining surfaces where they fit together. A layer of paint can be more than enough to spoil the matching fit. Now you can apply the paint.

Apply the paint sufficiently thickly, so that it doesn't show any application marks, but not so thick that it 'runs'. Let it dry, (about 20 minutes for Hammerite or Smoothrite) and then apply another coat.

Leave it to dry, and if the desired colour intensity and coverage has not been achieved, paint it again. Generally two coats is enough, especially of Hammerite.

Once you have got the surface as you want it, leave the job alone for at least 24 hours. This will enable the job to be really dry before you start to handle it.

FINISHING TOUCHES

Now you've reached this stage, it's time to consider the finishing touches. Extra care taken now, will be repaid by a better finish on your project.

Controls need labelling. And, unless you're one of the (rare) gifted calligraphers, don't try hand-labelling. It can look awful!

My advice is that you go to your local stationers, and buy some dry labelling. It can look awful! Calligraphers, don't try hand-labelling, unless you're one of the (rare) gifted constructors. The final, really professional touch is achieved by using the 'go faster stripe' lining material available from car accessory shops (see text).

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Don't buy the big A4 sheets, unless you are going to do a lot of lettering. Instead, I recommend that you buy the A5 or A6 sheets, as they're much cheaper and you don't waste so much.

Apply the transfers according to the manufacturers' instructions. And don't forget to leave space for the control knob to go on the shaft!

The final, really professional touch is achieved by using the 'go faster stripe' kits sold in car accessory shops. You only need the narrow stripes, and for less than a £1, you'll get enough to do a family car, and your latest project.

You can use the 'go faster stripes' to take the eye away from join lines. This is achieved by laying them down parallel to, and on either side

Good effects can be made by grouping similar controls together by putting a line round them. It's amazing what you can do with the transfers.

ENHANCE THE EFFECT

If you only lightly stick the transfers in place to start with, you can easily move them to enhance the effect. Once you're satisfied, rub them down (and the lettering) with a soft cloth.

Finally, seal the whole lot in place, protecting it by spraying one coat of clear lacquer all over the outside of the box. The lacquer sold in car accessory shops, as the final stage of a two-part paint process, is best.

All that has to be done now, is to fit your circuits and use the device. I make use of double-sided sticky pads to hold the bits and pieces inside.

Don't forget that a neat layout inside, is just as important as all the hard work you've put into making the outside look good. Remember this, and you'll be proud to show off your workmanship, and who knows, you might even win the constructors' cup at the club competition!

If you're keen to try making and using plastics enclosures for your projects, but have been put off by the r.f. screening problems, there's a new product that can probably help. Cirkit have introduced a range of metal screening cases, which although may not be considered as being good enough for an external casing, could easily have a plastics casing made to fit around them. The cases, made in a range of sizes, can be soldered to, are very versatile and details of sizes and prices can be found on page 69 of the Cirkit Winter 1992/1993 catalogue, available from high street newsagents. For further information contact: Paul Bennet, Cirkit Distribution Ltd., Park Lane, Broxbourne, Hertfordshire EN10 7NQ. Tel: (0752) 563222.

Suppliers for most materials are:

Design Craft & Graphics Ltd., 12 Hanborough Business Park, Long Hanborough, Oxford OX7 2AB. Tel: (0993) 882588.

K & M Ltd., 1 Wharf Lane, 24A New Wharf Road, Lowgates, Barlborough, Staveley, Chesterfield, Derbyshire S43 3TZ. Tel: (0246) 477471 or 812872.

More information on Finigan's paints from: Huntings Specialised Products Ltd., Acorn House, New Lane, Leeds LS11 5DZ. Tel: (0532) 441100.

Fig. 3: Typical rub-down transfer lettering, suitable for use on front panels, and a pack of the 'go faster stripe' lining material available from car accessory shops (see text).
The Hands Electronics RX1 3.5MHz Receiver Kit

Over the last few years, a number of companies have appeared in the amateur radio market offering r.f. kits for the constructor. These vary from small accessories to complete receivers, transmitters and transceivers.

A new name in the kit field is Hands Electronics. Their kits have a heavy accent on the v.h.f. and u.h.f. areas of the hobby, filling gaps in the current market.

Within the range of kits, there are h.f. projects, including a QRP transmitter and a superhet receiver for 3.5MHz. As I'm always interested in any new product which encourages amateur radio construction, I agreed to build and test the receiver.

Generic Receiver

The Hands Electronics RX1, is what I would call a generic NE602 receiver. Since it appeared in the mid 1980s, the Signetics NE602 integrated circuit has provided amateur radio constructors with a useful building block. Originally, the i.c. was designed for cellular telephone applications. However, the NE602 is another fine example of amateurs grasping the electronic 'crumbs which fall off the rich man's table'. The NE602, which has been made inexpensive through commercial application, has proved its worth when turned to amateur radio applications. The eight-pin dual-in-line packaged i.c. contains a double-balanced mixer, a bipolar variable frequency oscillator and a voltage regulator. This chip is the stuff of amateur radio receivers! And the Hands RX1 follows in a line of projects based upon this i.c. In this kit, there are only four active devices, excluding the regulator chip, which makes for a simple and compact circuit.

Block Diagram

A block diagram of the receiver is shown in Fig. 1. From the illustration, you can see that the RX1 is a simple, single conversion receiver without r.f. stage, automatic gain control (a.g.c.) or S-meter, although these can be added.

Signals from the antenna, at 500Ω impedance are selected by a band-pass filter. This is a carefully designed three-pole Butterworth filter with a passband of 500kHz. The signals are then transformer-coupled into the ports of the balanced mixer of an NE602, which forms the r.f. mixer.

The internal oscillator circuit, is used for the local oscillator in a Colpitts type circuit. The kit also provides extra pads for frequency coverage adjustments and temperature compensation, should the builder wish to experiment.

The main tuning capacitor has trimming and padding capacitors, allowing adjustments to enable the receiver to cover the whole 3.5MHz band. The balanced output from the NE602 mixer is then inductively coupled to a ladder filter.

The Ladder Filter

The receiver ladder filter uses off-the-shelf TV colour burst crystals, to provide an example working on the receiver's intermediate frequency of 4.433MHz. Hands Electronics claim that, unlike many other amateur designed ladder filters, this version has a symmetrical response and is computer designed with Butterworth coefficients.

The printed circuit board and the components provided, allow for two choices of bandwidth. It can provide a selectivity of 2.4kHz or a narrower design for c.w. use. The manufacturers advise less experienced constructors to at least begin with the 2.4kHz design. For more advanced constructors, extra pads are on the board, so they can tailor the response of the filter to suit their own needs.

Intermediate Frequency Amplifier

The i.f. amplifier is an MC1350P, a device commonly used in such circuits. The gain facility in this chip is used to provide a manual i.f. gain control. There's provision on the board to apply 12V to this port to mute the receiver when used with a transmitter.

The i.f. signal is fed to another NE602, which acts as

When the Editor learned about the Hands Electronics receiver, he thought that the well-known home-construction enthusiast, the Rev. George Dobbs G3RJV, was the 'best man' for the job!
both the product detector and beat frequency oscillator.
The b.f.o. is configured as a variable crystal oscillator
(v.x.o.), to allow adjustment of the carrier insertion
frequency.
The audio stages come from the familiar LM386.
There's also a three-legged regulator i.c., and this provides
a stabilised 6V supply for the other i.c.s apart from the
LM386.

**Good Quality Board**

The construction is based around a good quality,
doubled-sided p.c.b. The top of the board is a groundplane,
including many of the grounding points in the circuit.
The p.c.b. is well made and tinned. It also has the
component placements clearly silk screened on the top
side. The components supplied appear to be of good
quality, with no apparent substitution of inferior or surplus
parts.

With the Hands kit all the controls are supplied. These
included a switched potentiometer for the volume control,
the i.f. gain potentiometer and a good quality Jackson
variable capacitor for the main tuning.
The required antenna, power and audio output plugs are
also supplied. An optional case is available for the RXI. I
built mine in the case supplied by Hands Electronics.
The construction manual supplied with the RXI kit, is
at an intermediate level. That means, it's neither of the
Heathkit 'tick it off step-by-step' kind nor the 'here's a
circuit and the bits now do it yourself' type.

The manual begins with a general guide to
construction, including how to identify components. The
circuit diagram is supplemented with a clear layout
drawing, and component check list. There's also a test and
alignment section, which describes how to get the receiver
going.

**Construction Manual**

The construction section of the manual is adequate for
all levels of constructor, with the probable exception of
real beginners. This is because there are a number of links
to be fitted between the ground plane and the underside
tracks.
The fitting of the links are explained, but they are
perhaps somewhat lost in the text. I can remember once
helping a kit builder, sort out a kit which he had spent
many hours trying to fix, only to find he had left out a
critical ground link. So, check these carefully!

The placement of components is greatly aided by the
screen-printed locations on the top of the board.
Personally, I prefer to build from the circuit rather than a
layout diagram.
I always find a ground plane on the top of a board
disconcerting, because I cannot see the shadow of the
tracks through the board. In this case, both the layout
drawing and the printed locations make the task easy.

**Winding Inductors**

Clear instructions are given for the winding of three
inductors (four if the c.w. version of the filter is used). My
advice to the manufacturers (on any revision of the
manual) is that they include drawings of how the inductors
look, and their location on the board.
I say this, because in articles I've written in the past
which involved hand-wound inductors and transformers,
these appear to have caused constructors the most
problems. Because of this, I used to have a standard letter
and drawing for the mixer transformer for the PW 'Teme'.
I thought it was simple, but plenty of others didn't!

**No Special Equipment**

The kit manual claims that no special equipment is
required to set up the receiver. So, I decided to align it
"bareback" - without the use of test equipment.

After following the recommended d.c. tests, I switched
on the receiver and followed the instructions in the
manual. As advised, I set the trimmer and padder
 capacitors on the v.f.o. at half mesh - and hit the band first
time!

In fact, I was very impressed by the v.f.o.'s frequency
determining component choice. With very little
adjustment, the receiver covered almost exactly 3.5 to
4MHz. Past experience with home built v.f.o.s has taught
me that this is no easy achievement!

I set the trimmer on the b.f.o. by ear, for best s.s.b.
reception. I then repeated the whole alignment exercise
with test equipment and found that very little adjustment
was required. The manual is right - you can do it without
test equipment.

The description of how to set up the receiver, is a little
fussy. It could perhaps be improved by adding, or merely
only having, a simple numbered list of steps.
Nothing, for example, was said of how to read the v.f.o.
frequency with a frequency counter. In fact, this can be
picked off pin 7 of the NE602. However, using the
frequency counter does require light coupling into a
sensitive counter, so perhaps that's why the technique was
left out.

The v.f.o. can be listened for on another receiver. But
the only methods of finding the band suggested in the
manual, are those using a signal generator or listening for
signals on the band.

In my case, I found signals as soon as I switched on the
receiver. I suspect it would have been more difficult if the
v.f.o. was well out of band, as the band-pass filter gives
tight selectivity.

**Good Performer**

The RX1 proved to be a good performer. The stability
of the basic receiver was good, and the long term drift was
negligible.

The sensitivity was well within the requirements of the
3.5MHz band. The receiver proved that it was capable of
detecting a signal of less than 1µV.
I used the receiver over several nights of listening,
using my 40m long doublet antenna via an antenna tuning
If someone can make a dual-band transceiver as small and feature-packed as this, who cares about its looks? Especially if it's also so sturdy that it shrugs off the knocks and shocks of a lifetime's use. And especially if it has a host of product features, from built-in DTSS and paging functions to alphanumeric memory, simultaneous dual-frequency receive and message paging. We'll tell you who cares. Kenwood cares. Which is why the TH78E isn't just the nearest dual-band transceiver you can buy, it's also the best designed. Right down to thoughtful touches like the sliding keypad cover.

So visit your nearest Kenwood approved dealer, pick up the TH78E and admire its ergonomic curves at close quarters. Or simply take in the wonders of its specification. Either way, it's love at first sight. Kenwood TH78E is part of a range of hand portables from £240 to £430.
Errors & Updates

A Low Cost 1.2GHz Pre-Scaler
Pages 18-23 PW August 1992

Two errors crept into the track pattern and component overlay drawings (Figs. 3 and 4) on page 21 of the August 1992 issue. There was a small section of track missing in the drawing Fig. 3, connecting pin 4 of IC4 to the OV rail. The complete track pattern is reproduced again here for you. Please make this link to allow the circuit to work as described.

WR308, Getting Started The Practical Way
Pages 39-43, PW July 1992

For readers who have purchased the p.c.b. WR308, a link was missing in the manufacture of the original p.c.b. to make the circuit work as described, please link pin 7 of IC1 to the nearest OV point. This error will be corrected on all p.c.b.s sent out after 23 November 1992.

Please accept my apologies for these errors. Editor
KENWOOD APPROVED DEALERS

AXMINSTER
Reg Ward & Co, 1 Western Parade, West Street, Axminster, Devon.
Tel: 0297 34918

BELFAST
GM Electronics, 1-3 Evelyn Avenue, Belfast, Northern Ireland.
Tel: 0232 471295

BIRMINGHAM
South Midlands Communications, 504 Alum Rock Road, Alum Rock, Birmingham. Tel: 021 327 1497

BIRMINGHAM
Ward Electronics, 422 Bromlord Lane, Ward End, Birmingham.
Tel: 021 328 6070

BOURNEMOUTH
Lowe Electronics, 27 Gillam Road, Northbourne, Bournemouth.
Tel: 0202 577760

BRISTOL
Lowe Electronics, 79 Gloucester Road, Parchway, Bristol. Tel: 0272 771770

Birmingham
AMDAT, 4 Northville Road, Northville Bristol. Tel: 0272 699352

CAMBRIDGE
Lowe Electronics, 162 High Street, Chesterton, Cambridge.
Tel: 0223 311230

CARDIFF
PMR Ltd, Industrial Estate, Gwaelod-y-Garth, Cardiff. Tel: 0222 810999

CLACTON ON SEA
Coastal Communications, 19 Cambridge Road, Clacton on Sea, Essex.
Tel: 0255 471292

CORK
Intronic Ltd, Windsor Hall, Glaunhaune, Cork, Eirg.
Tel: 010 353 2135 4422

COUNTY TYRONE
Tyrone Amateur Electronics, 44 High Street, Omagh, Co Tyrone, Northern Ireland. Tel: 066 242043

CUMBERNAULD
Lowe Electronics, Cumbernauld Airport Cumbernauld. Tel: 0236 721004

DONCASTER
Alan Hooker, 42 Nether Hall Road, Doncaster, South Yorkshire.
Tel: 0302 325690

EALING
Martin Lynch, 286 Northfield Avenue Ealing, London. Tel: 081 566 1120

EASTCOTE
Lowe Electronics, 223 Field End Road, Eassecote, Middlesex. Tel: 081 429 3256

EDGWARE
Haydon Communications, 132 High Street, Edgware, Middlesex.
Tel: 081 951 5782

FIFE
Jaycee Electronics, 20 Woodside Way, Glenrothes. File: Tel: 0952 756962

HANGER LANE
A R E, 6 Royal Parade, Hanger Lane, London. Tel: 081 997 4476

HAYWARDS HEATH
Bredhurst Electronics, High Street, Handcross, Haywards Heath, West Sussex. Tel: 0444 400786

HOCKLEY
Waters & Station Electronics, Spa House, 22 Main Road, Hockley, Essex.
Tel: 0702 206835

LEEDS
South Midlands Communications, Nowell Lane Ind Est, Nowell Lane Leeds.
Tel: 0532 350006

LEEDS
Lowe Electronics, 34 New Briggate, Leeds. Tel: 0532 452657

MAIDSTONE
Lowe Electronics, Chatham Road, Sandling, Maidstone. Tel: 0622 692773

MATLOCK
Lowe Electronics, Chesterfield Road, Matlock, Derbyshire. Tel: 0629 380800

NEWCASTLE
Lowe Electronics, Newcastle Airport, Woolston, Newcastle.
Tel: 0661 860418

NEWPORT PAGNELL
Photo Acoustics Ltd, 58 High Street, Newport Pagnell, Bucks.
Tel: 0908 610625

NEWTON LE WILLOWS
Amateur Radio Comms Ltd, 38 Bridge Street, Earlestown, Newton Le Willows Merseyside. Tel: 0925 229881

NORFOLK
Eastern Communications, Cavendish House, Happisburgh, Norfolk.
Tel: 0692 650077

NORTH HUMBERSIDE
Peter Rodmell Communications, Field Head House, Leconfield, North Humberside. Tel: 0964 550921

NOTTINGHAM
R A S Nottingham, 3 Farndon Green, Wollaton Park, Nottingham.
Tel: 0602 280267

PORTSMOUTH
Nevada, 189 London Road, Portsmouth, Hampshire.
Tel: 0705 662145

SLOUGH
Lowe Electronics, London Heathrow, 6 Chervel Close, Langley, Slough, Berkshire.
Tel: 0753 545255

STOURBRIDGE
Dewsbury Electronics, 176 Lower High Street, Stourbridge, West Midlands.
Tel: 0384 390063

KENWOOD
HOME AUDIO, CAR AUDIO, COMMUNICATIONS EQUIPMENT, TEST AND MEASURING INSTRUMENTS, TELECOMMUNICATIONS
The completed PW-80 direct conversion receiver.

If you've followed the last few parts of this series, then you're almost ready to complete an amateur band receiver. The two most important circuit elements of a d.c. receiver, the v.f.o. and mixer board, are already completed.

You may recall that the mixer converts the incoming radio frequency signal, to an audio signal by 'beating' it with the v.f.o. The resulting audio signal is at a very low level, and only the strongest stations would be heard, even if a pair of sensitive headphones were used.

The lack of audio is a small price to pay for simplicity. The receiver only requires an audio amplifier to increase the strength (amplitude) of the audio signal to a comfortable listening level.

Already Built

Fortunately, we have already built an audio amplifier in this series. This amplifier will serve the purpose in our receiver.

In ‘Getting Started - The Practical Way’ February 1992, I described an audio amplifier which formed half of a piece of test equipment called the ‘OscAmp’.

The whole circuit is based on an LM386 integrated circuit. The full circuit, p.c.b. design and component overlay, can be found on pages 32 and 33 of the February issue of PW.

In the February ‘Getting Started’, Fig. 1, shows a
resistor (R1) in the circuit path between pins 1 and 8. This resistor sets the overall gain of the amplifier.

Making R1 a lower value increases the gain. And for this application we require maximum audio gain, so a short circuit is used by connecting a link wire in place of, or across, R1.

In Fig. 1, on the audio amplifier p.c.b. (marked WR300), the wire link is shown across R1. Additionally, in my prototype receiver, I also used a higher value 100kΩ potentiometer for the volume control.

Boards Joined

The photograph in Fig. 3 and the diagram, Fig. 1, show how the three p.c.b.s are joined to make the PW-80 Receiver. The power supply is a 9V battery, switched on or off by S1. Power must be taken to all three boards.

The signal paths all use screened lead. The ideal screened lead to use is miniature 50Ω impedance coaxial cable, but this can be expensive and not too easy to obtain.

In practice, thin screened cable of the type sold as microphone lead, does the job very well. The inner core carries the signal, and the outer screening is joined to ground on the p.c.b.s.

The v.f.o. output is taken via screened cable, to the v.f.o. input point on the mixer board. The mixer board also receives the radio signal input from the antenna.

Any suitable antenna socket can be used for the signal input. Choose the type that's in normal use in your shack.

I tend to use the well-known 'phono' plugs and sockets for low power radio work. They're cheap and cheerful, and they serve the purpose well.

Another screened lead, takes the audio signal from the mixer board to the audio amplifier. The original p.c.b. allows for the volume control to be connected directly to the board. This is not so convenient for this application.

Having the audio amplifier board 'hanging' from the volume control, presents problems when mounting the board into a small case. However, the board can be used with an external volume control which is mounted on the front panel of the receiver.

If you do use an off-board volume control, I recommend that you use a combined volume/on-off switch potentiometer. I would also strongly advise the use of screened cables for these connections.

Small Loudspeaker

The LM386 audio amplifier i.c. can drive an 8Ω loudspeaker. I used a 50mm diameter speaker in my prototype receiver.

The output level of the LM386 is only just enough to drive a speaker in good conditions, so the option of using a pair of headphones is included. The usual way to do this, is to use a switched jack socket.

A pair of headphones of the type used on personal stereophonic use.

The conversion is done by changing the jack plug to a 3.5mm mono type, although this means the headphones can't be used for the cassette player again.

The conversion can be done by changing the jack plug to a 3.5mm mono type, although this means the headphones can't be used for the cassette player again.

The case I used, also allows space for a small internal 9V battery (a PP3 would fit inside but its life would be limited). In practice, I provided a couple of terminals on the back panel to connect the receiver to a larger battery.

To make the project tidy, I mounted the mixer board and the audio amplifier board on the v.f.o. enclosure. In the photograph, you can see that the mixer board is on the bottom of the enclosure.

You can also see the audio board is mounted on the top, using stand-off pillars. This keeps the whole of the electronics together, even without using the box.

The v.f.o. enclosure is mounted on its side, on the bottom of the case. This gives the correct height for the tuning shaft, to allow good use of the front panel for a tuning scale.

The layout of the v.f.o. and other boards may be seen in the photograph. The on-off switch/volume control and the tuning capacitor are all on the front panel.

Mounted on the rear panel are the 3.5mm audio output jack, the antenna input socket and two terminals for the 9V supply. The side panel nearest the audio board has a 50mm loudspeaker held in place with glue, which I applied from a hot glue gun.

Casing The Job

When it comes to casing the job, experienced metalworkers will no doubt make their own enclosure.

They'll be able to fashion the case in such a way that it looks like a commercially-made piece of equipment.

We, lesser mortals, rely upon pre-built boxes and hand-tools to do the best job we can! However, the years have taught me a few ways of making my cases look better.

The first rule, is to make sure that everything is well marked out before any hole cutting in the case begins.

Holes in aluminium cases have a sort of finality about them!

I always use a punch to locate the holes, as aluminium is soft and a drill bit can easily 'walk' across its surface. I also drill all my holes smaller than required, and then bring them up to size with a small hand reamer. Drills have a habit of making oblong holes in aluminium!

The finished front panel can make the difference between a crude looking project, and a piece of fine work. Some constructors spray their cases with car spray-paint, and use rub-down lettering to obtain an attractive finish. Car spray-paint is sometimes difficult to get to 'key' onto bare aluminium.

When I'm using spray-paint, I use a 'false front' made from thin card or paper. It might sound crude, but it can produce a very smart result.

Receiver Completed

After the receiver is completed, and everything is seen to fit on the front panel, remove all the controls from the front panel. Then, you'll need to cut a piece of paper or thin card, somewhat larger than the panel.

The use of paper or card, means that any colour may be used for the panel. Lay the paper face down on a flat surface, and then place the front panel face-down on to the paper.

Using a ball-point pen, mark out the outer edges of the front panel and mark around the insides of all the holes. The indentations of the pen marks should show on the front of the paper.

The words or other legends can now be added to the paper. I use rub-down letters, but because it's paper, they may be typed or even hand-written on the front.

Remember, you must leave enough space for the knobs to fit on the front. It's so easy to mark the letters, only to find that a knob covers part of the words. Smear a little adhesive from a glue-stick on the front of the case, which will lightly fix the paper to the front panel.

Prototype Case

The photograph shows how the three boards fit into a case. The prototype receiver was mounted in an aluminium case 152mm x 114mm x 76mm, sold by Minfford Engineering as 'Aluminium Box type AB31' (address at end of text).

Any box of similar dimensions could be used. Although a slightly smaller box would do, an adequate front panel is required to allow for a readable tuning scale.

Practical Wireless, January 1993

In the final part of this series of 'Getting Started', the Rev. George Dobbs G3RJV explains how to complete the direct conversion receiver that's been featured over the last few months.

Continued on page 41
C508 Twin Banders

**Transmitter:**

- **VHF:** 2.5W, 2.0W, 1.5W, 2.0W, 2.0W, 1.5W
- **UHF:** 2.5W, 2.0W, 2.0W, 2.0W, 2.0W, 1.5W

**Receiver:**

- **VHF:** 2.5W, 2.0W, 1.5W, 2.0W, 2.0W, 1.5W
- **UHF:** 2.5W, 2.0W, 2.0W, 2.0W, 2.0W, 1.5W

**Audio Power Output:** 200 mW at 10% distortion

**SN Ratio at 0.5µV input:** 25 dB

---

**C500 Accessories:**

- **CLC100:** Carrying case C300 with CNB111 battery
- **CLC501:** Carrying case C500 with CNB120 battery
- **CMP111:** Speaker microphone
- **CMP113:** Tie-pin microphone
- **CMP115:** Speaker microphone (small size)
- **CNB111:** Nickel battery pack (5.0W VHF/3.0W UHF)
- **CNB120:** Nickel battery pack (12V)
- **EBM:** Empty battery case for dry cells
- **CSA111:** Desk top charger CNB111
- **CHP111:** Mobile charger CNB120 battery
- **CMP114:** Nickel battery pack (12V-600 mAH)
- **CTCSS Tone Squelch Unit:**
- **Charging Adaptor:**
- **CTD102:** Mobile power cable
- **CMU111:** Battery cover
- **CLC102:** Mobile power supply cable
- **CTD142:** Despatch unit
- **CTD141:** Desk top charger
- **CTD140:** Desk top charger
- **CTD132:** Desk top charger
- **CLC152:** Mobile charger CNB150/C528
- **CLC151:** Mobile charger CNB150/C528
- **CLC150:** Mobile charger CNB150/C528
- **CLC140:** Mobile charger CNB150/C528
- **CLC130:** Mobile charger CNB150/C528
- **CTD120:** Charger for CNB152 battery
- **CTD110:** Charger for CNB151 battery
- **CMU102:** Battery contact covers
- **CTD132:** Charger for CNB150/C528
- **CLC120:** Charger for CNB150/C528
- **CTD110:** Charger for CNB150/C528
- **CMU101:** Battery contact covers
- **CTD120:** Charger for CNB150/C528
- **CMU102:** Battery contact covers
- **CTD110:** Charger for CNB150/C528
- **CMU101:** Battery contact covers

**C400 Edgware Road, London W2**

**Telephone:** 071-723 5521 **Telex:** 298765

Opening times: 9.30am-5.30pm Mon-Fri. 10am-4.30pm Sat.

**Due to the fluctuating exchange rates, we are at present unable to publish prices.**

**PLEASE PHONE**
Scratch And Waterproof

The next stage is to make the front panel scratch and waterproof. This is done with clear, sticky-backed plastics, the sort of stuff that is sold to cover books. Carefully lay the plastics material over the front panel. A little care is needed here, because it can wrinkle easily. It's a good idea to allow a little extra of the plastics material, to wrap around the edges of the panel. The holes can now be cut out, using a sharp-pointed modelling knife. This is done by pressing the knife against the edge of the hole to get a clean cut.

I have often used a case a second time, by drilling new holes in the gaps between the original holes. The original holes are then hidden by the paper front. The plastics covering protects the rub-down lettering from being scratched.

Setting-Up And Calibration

There are two simple tasks required to get the receiver working - the setting-up and calibration. All we have to do, is get the v.f.o. tuning range correct, and peak the input inductors on the mixer. The v.f.o. is particularly easy to set up. As I've already described, setting-up the v.f.o. can be done using a frequency counter. It can also be done by listening for the signal on an existing receiver.

When you're actually carrying out the procedure, it's useful to add frequency calibration points on the front panel. The simplest way is to attach a pointer to the shaft of the slow-motion drive.

The in-line drives usually have a wider shaft just behind the small knob shaft, which moves at the rate of the variable capacitor. This often has a plate on it, fitted with a couple of screws for attaching a scale.

I used one of the screws on the drive to hold a stiff wire pointer. The calibration is then done with the receiver or the frequency counter.

The number of calibration points depends on the dedication of the constructor. I only use a few! In practice, the calibration marks can be added on top of the clear plastics covering before the receiver is completed. Alternatively, the calibration can be added before the plastics covering is applied.

The second choice, adding the calibration before the covering is applied, means extra work. This is because the controls need to be mounted on the front panel, and the holes are then removed again after calibration, and finally returned after the plastics covering is added.

Receiver Selectivity

The receiver selectivity, is its ability to sort out one station from another. This depends upon the input tuned circuits on the mixer board, and the bandwidth of the audio amplifier (don't forget the i.f. is actually at audio frequency).

On the mixer board, the inductors have adjustable cores to peak the required signals, and to reject the unwanted signals. As the inductors are set and left to cover the whole band in this circuit, the result is somewhat of a compromise, albeit a well worked out compromise! In practice, the cores are best adjusted using a trimming tool designed for the job. A small screwdriver will work, but it's best to avoid using one, as the metal shaft will affect the tuning.

Also, be warned! These cores are brittle, and they can be easily broken by careless application of a screwdriver. There are two cores to adjust, and the one nearest the mixer will probably have the greatest effect on the tuning.

The idea is to effect a compromise with the cores, to give the best peaked signals across the band. To do this, I usually begin by peaking a signal in the centre of the band,

Well, that's the end of this series of 'Getting Started - The Practical Way'. We've been together now for almost two years, and have covered everything from resistor networks to working with integrated circuits, and ending up with a useful little receiver. PW

Are you late in getting started? Don't worry if you've missed part of the G3RJV series. If you want to build the PW-80 direct conversion receiver, photocopies of the articles dealing with this project are available for 85p (including postage) each. Readers requiring the full set should write to: Getting Started Receiver, Atten. Donna Vincent, Practical Wireless, Eneco House, The Quay, Poole, Dorset BH15 1PP. The issues relevant to the PW-80 are: February, May, September, November and December.

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This type of front panel can hide a 'multitude of sins'. Any scratches are hidden, and it's even possible to hide wrongly drilled holes.

I have often used a case a second time, by drilling new holes in the gaps between the original holes. The original holes are then hidden by the paper front. The plastics covering protects the rub-down lettering from being scratched.

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Also, be warned! These cores are brittle, and they can be easily broken by careless application of a screwdriver. There are two cores to adjust, and the one nearest the mixer will probably have the greatest effect on the tuning.

The idea is to effect a compromise with the cores, to give the best peaked signals across the band. To do this, I usually begin by peaking a signal in the centre of the band,

followed by adjustments at the low end.

You may be fortunate enough to have a signal generator which can give a signal on the 3.5MHz band. If so, the job is easy, but ought to be done with the weakest signal strength that can be heard in the receiver.

If a signal generator isn't available, don't worry! You can use signals on the band. After all, that's what the receiver will be used for!

When using the off-air method, it's best to look for signals that are clear but not very strong at the required parts of the band, before peaking them with the adjustable cores.

Funny Old Band

The 3.5MHz allocation, is a funny old band. During the daytime there may only be a few s.s.b. signals from the nets that use the band. During the evening however, there could be too many signals! Remember that this receiver is designed for a 500kHz input impedance.

Few of us have an antenna which gives a natural 50Ω termination on 3.5MHz. So, to overcome this, an antenna tuning unit (a.t.u.) will be required for best results. (Don't forget that we built one earlier in this series).

Not Sophisticated

The PW-80, may not be the most sophisticated amateur bands receiver, but it will certainly receive plenty of signals. And it's much more fun when you have built it yourself!

Well, that's the end of this series of 'Getting Started - The Practical Way'. We've been together now for almost two years, and have covered everything from resistor networks to working with integrated circuits, and ending up with a useful little receiver. PW

A suitable case for the PW-80 receiver is sold by: Minfford Engineering of Sun Street, Ffestiniog, Gwynedd, North Wales LL41 4NE. Tel: (0766) 762572.

This series has been aimed at the beginner. I've enjoyed reading your letters, and I have had great pleasure in helping readers to get going in the hobby. I hope you've enjoyed it too, because that's what it's all about! Cheerio for now.

Are you late in getting started? Don't worry if you've missed part of the G3RJV series. If you want to build the PW-80 direct conversion receiver, photocopies of the articles dealing with this project are available for 85p (including postage) each. Readers requiring the full set should write to: Getting Started Receiver, Atten. Donna Vincent, Practical Wireless, Eneco House, The Quay, Poole, Dorset BH15 1PP. The issues relevant to the PW-80 are: February, May, September, November and December.
Welcome to 'Bits & Bytes - The Computer In Your Shack'. If you don’t have a computer at the moment, are you thinking of adding one to your shack equipment list in the future? And, if so, are you worried about what to get and how to use it when you get it? Don’t worry, I’m not being nosey! But if any of these questions gain a yes from you, then 'Bits & Bytes' is especially for you. If you answered no to any or all of these questions, then read on, because you may still find items of interest to you.

Thanks to the newly introduced Novice Licence, amateur radio is seeing an increasing number of younger people entering into our hobby. As these ‘newcomers’ have grown up with the computer, it’s only natural that they should bring their computers, and computer knowledge into the hobby with them. Please don’t misunderstand me. I’m not suggesting that the Novice Licence, or the younger generation brought computers into the amateur radio shack! We all know that radio amateurs have been using computers, almost since the day computers were generally available.

Computer Aware

Nowadays, an increasing number of people are very computer ‘aware’. It’s this obvious fact, that has dictated the need for a column such as ‘Bits & Bytes’ in PW.

The response to the ‘Computing In Radio’ supplement in the April 1992 Practical Wireless is proof of this demand. And, the requests and response in letters sent to ‘Receiving You’ has added weight to the need. So, here I am, to fill that need for you! And, it’s my intention as the months go by, to look at the many ways in which a computer can be put to good use in the radio shack.

I’ll review as much amateur radio-related software (programs), and computer hardware (add-ons), as I can get my hands on! But mainly, I want this to be better known as a ‘lets-help-each-other’, and ‘learn-how-to-do-it’ column. It’s got to be a practical radio computing column, because this is PW!

Computer Knowledge

There are many radio amateurs out there, with a lot of knowledge about computers. There are also a considerable number of amateurs with very little knowledge of computers. So, it seems only natural that we should pool our knowledge and help each other. After all, isn’t this what amateur radio enthusiasts around the world have been doing for many years now?

Sharing the knowledge is especially important, with regard to designing and building equipment, and learning new operating skills. Well, we can build our own computers, and learn new ways of using them if we help each other.

Practical Wireless, January 1993
The Hunter Family

First, I'd better introduce the Hunter family! The photographs show my wife Elaine G1WOQ, and myself in our shack.

It's mainly due to my largeness, and partly the shack's smallness, that stops us from both fitting into the same photograph! The pictures also show the radio and computer equipment we use.

We haven't always been in wheelchairs though. When we married in March 1984, and moved to Norwich from London, I was a driving instructor with the British School of Motoring.

Elaine was working full-time for a cosmetics company. We had no real interests in amateur radio at that time, but were both very interested in computers.

During 1985/86 I had two fairly major operations on my back, both of which were unsuccessful. After that, rheumatoid arthritis started to take a hold. Although I can get around the bungalow with one or two sticks occasionally, I need the chair most of the time. In 1986, Elaine was diagnosed as having severe Multiple Sclerosis, and she can now only get around with her electric wheelchair.

A Real Boon

Amateur radio has been a real boon to us. It allows us to chat to people all over the place. We particularly like packet radio.

Elaine likes packet radio because the MS effects her speech to the point of embarrassment at times. I like packet because you don't need elaborate antennas!

It's just as well that elaborate arrays aren't required. This is because the local council's planning department have only granted us permission for a single 10 metre pole, with one vertical antenna on top.

It's a pure coincidence that the guy wires to this pole resemble a G5RV! But I did, at one stage, consider holding the planning committee to their word.

I thought of placing a half-wave vertical antenna for 1.8MHz on my mast. Sorry, I meant pole! But, for obvious reasons, I decided against that idea.

Our shack radio equipment comprises a Kenwood dual-band v.h.f./u.h.f. f.m. transceiver, and a Yaesu FT707. Both rigs are on loan from the Radio Amateur Invalid & Blind Club.

The RAIBC also helped make arrangements with the City & Guilds for us to sit the RAE at home. This extremely helpful facility was further extended by the RSGB when I took the Morse test at home.

The Shack Computer

The computer that we've got in the shack now, is an IBM PC/AT 386 compatible machine. I built it myself, using components I bought from magazine adverts. Some parts I bought new, but the majority were second-hand.

Over the years, we've had many different computers. Normally, we would sell or exchange one set-up so as to get another. Our decision was not always the right one though!

Make And Model

Well, now it's time to get down to work, and get a couple of points clearly understood. Firstly, the make and model of computer that you have is not important.

Computer gear is like amateur radio equipment. It's not vitally necessary to have the very latest, super-powerful 'all singing all dancing' gear, to be able to get it to do what you want.

Somewhere, you will find programs written for just about any type of computer. This is one of the reasons I like packet radio so much. A bulletin put out on packet radio, can find an assortment of information that would otherwise seem non-existent.

Age And Education

My second point is that age and education are not factors for consideration, when it comes to using a computer in the shack. In fact, these are two areas where the computer will really be useful.

If you tell the computer to remember something, it will. For the rest of its life if you want it to. And it will remember exactly what you told it, and not many humans can do that! There's no need to worry if you are not too good at maths or spelling, or electronic calculations. The

Elaine Hunter G1WOQ shares the interest in computers and the shack with husband Peter.
BUY NOW... NOTHING TO

FT 990
Another newcomer from Yaesu. 100w Multimode H.F.Tcvr with gen.coverage rx, plus ATU and PS included -if you want them! This one's outsold my FT1000 sales!

IC 728/9
The easy to use ICOM twins HF base/mobile delivering 100w out on all bands, and 10w on 6m with the IC729. Outstanding value...PBT and speech processor fitted! You should call in and try one.

FT 290R II
with linear
Totally unique concept in 2M operation. A super portable/base multimode. Add the linear and you have a 'different' rig! High performance.

ICW21E
Others have copied... but none can quite match the feel of these super handles. 2m/70cms- receives both simultaneously. High speed scan.

ICW21E

FIRST TO BRING YOU THIS GREAT SCHEME....
Readers and customers will be delighted to know that once again, I am able to re-introduce the highly successful BUY NOW -PAY LATER scheme, introduced about the same time last year! With thanks going to Tricity Finance, (and your's truly), this crafty little scheme means you can select the rig of your choice, and pay 'not a penny!', until 3 months are up. You can then pay the balance in full, with NO INTEREST CHARGES, or pay 'lumps' off your amount owed on a monthly basis.

MARTIN LYNCH GIFT VOUCHERS
Our £25 Gift Vouchers still represent an excellent way to handle the headache of buying gifts! Remember there's absolutely NO TIME LIMIT on spending them...so why not use them to save for your new rig, and top up with anything else legal! (Credit Cards, Part Exchange, Cash or H.P.).
PAY FOR THREE MONTHS!!!

DIFFICULT TIMES...

In these difficult times of joblessness and unemployment, it is clear to me how important it is to deal with every customer on an individual basis. I do not trade as a 'cash & carry' superstore, even though my buying power allows me to bring better prices to you. Being an authorised stockist for all that I sell is something of great importance to me. I want to supply not only professionally made, first class equipment, at an optimum price, but also as a reliable and 'bona-fide' retailer with full factory 'back-up', as a result of the goodwill developed between myself and the manufacturers over the years.

MARTIN LYNCH PRICE PROMISE

Yes, it still stands - if you are offered a better deal (in writing) from another authorised dealer anywhere in the U.K., just show it to me and I'll match it!

WE ARE AUTHORISED STOCKISTS FOR ALL THAT WE SELL

FT 890

This is the rig that's selling like 'hot cakes'. The minute multiband, multimode HF 'superig'. 100w output. Ideal for base/mobile. See one, try one, and buy one!

FRG 100

Straight from Yaesu's stables, a fantasmagorical new H.F. receiver, with a truly remarkable performance. Without unnecessary user complexity. Small, neat, and ideal for those of you wanting to work crossband on a budget!

FT 530R

Latest dual band handle we've all been waiting for. Full 5 watts on 2m/70cm. Digital readout, remote speaker mike as option...dual receive on one band at once! Spectacular features. Guaranteed mind boggling features.

FT 1000

Must be world's no.1 H.F. receiver. Very special deals for the really discerning operator who wants 200w of quality power! Multimode facilities, super engineering...come and try one!

FT 736R

Another winner from Yaesu...selling very fast. The only VHF/UHF base station to offer 25w on 2m AND 70cms —plus 6m and 23cms as option! Built in PSU.

STANDARD C558

Sequel to C528, dual band handle 2m/70cms tcvr. Advance features...tiny in size. So easy to use I can operate it! High quality advanced engineering at it's best.

HAVE AN ENJOYABLE XMAS FROM MARTIN & STAFF!!

*SALES *SERVICE *MAIL ORDER NATIONWIDE: 081-566-1120
The antenna system at the Hunter’s home, the pole also supports a G5RV antenna.

computer is faster and more accurate than I will ever be! Just remember that if you can control a machine by pressing buttons, you can control a computer.

You could be forgiven for mistakenly thinking this is going to be a computer course. It isn’t!

‘Bits & Bytes’ won’t be one of those articles that goes on and on about computers either. There are enough of those in the computer press if that’s what you want.

Different Ways

In ‘Bits & Bytes’ I will be looking at the different ways in which a computer can be put to use in the shack. At the same time I will endeavour to answer any problems you may be having.

The problem sharing may involve things such as: getting a program up and running, or fitting an add-in-card (TNC for instance) into your PC. In this way, I’ll be trying to show that, not only can anyone operate a computer, but everyone that has one can benefit from their machine.

The main purpose of the column is so that we can help each other to get the most out of our computers. Now when I say we, I mean you as well! I need you to talk to me. This has got to be a two-way exercise. Please don’t panic - I’m not going to ask you to write long letters for me to include in this column.

I’m quite happy to do all the writing. What I need from you is information.

Software Items

You may have some software items that you use all the time, or often for a certain task, such as for log-keeping during a contest. If you do, just drop me a line and tell me about it.

If it’s in the Public Domain or Shareware and works on a PC, send me a copy (I’ll send your disk back). If it has copyright and/or is not for the PC, then tell me about it anyway.

Tell me what it does, how well it works, and where our readers can get a copy. That’s the sort of thing that will help me to help you.

Likewise, if you have any helpful hints or tips that you think readers would like to hear about, let me know. I’ll always put your name to anything you tell me.

It may be, for example, that you have found a new way of storing information about sked’s on the computer. Share it with us.

Also, if you’re trying to find the best way to do a certain task, let me know. If I can’t help you, I’m sure that one or more of our readers will be able to assist in some way.

Open Invitation

Next, I’m offering an open invitation to all those software writers, publishers, librarians, etc., who read PW. The invitation is also open to those clever people who make the hardware that we add on (or plug in) to our computers.

I’d like to hear from those enterprising people who advertise PCs in kit form. And we mustn’t forget those who write books about using the computer with amateur radio equipment.

To everyone, I ask you to please send me your products for review! Any review that I do will include one or more photographs.

I’ll also include full details of who supplied the item being reviewed. But, take heed, as there won’t be any complicated technical details in this column.

All items will be looked at, and reported on, through the eyes of the user. The reviews will be a hands-on description, from installation (or assembly) to operation, and beyond!

If the software you produce or sell is not for the PC, please send me details anyway. It’s useful to let everyone know what is available for their computers.

Not Data Comms

In case you haven’t realised it, this is not a data communications column. Although I’ll be looking at software, and possibly hardware, for all the popular data modes, ‘Bits & Bytes’ is a computer in the shack page.

Even if you never use the computer with your radio equipment, there are many ways in which the computer can be put to very good use. This is especially true now that we are allowed to keep logbooks on magnetic media (computer tape or disk).

In this first column I have tried to give you some idea of my intentions for the future. But as yet, I’ve had no items to review, and no feedback from you.

Hopefully, by the time the next ‘Bits & Bytes’ is published, I’ll be up to my ears in mail!

There are three ways in which you can contact me. You can use the postal service and write to me at: 2 Mayes Close, Bowthorpe, Norwich NR5 9AR. Alternatively, you can send me a packet message via: G0G SZ @ GB7 LD I.#35.GBR.EU. You can also telephone or FAX me on Norwich (0603) 748338. The telephone will very often be switched to the answering machine, but I always listen to my messages, and act upon them!

So, it’s cheerio until the next edition of ‘Bits & Bytes’, and in the meantime I’m looking forward to hearing from you all.

73 de Peter G0G SZ.

PW

Practical Wireless, January 1993
Teaching An Old Hand New Tricks

As he approached retirement, Ernie Godfrey found that his interest in the radio hobby was re-kindled by the Rev. George Dobbs G3RJV’s ‘Getting Started - The Practical Way’. And as we’ve got a kit-building theme, he thinks his experiences might encourage a few others to get going again.

Ernie Godfrey says “You could say that I’ve been ‘converted’ by the Rev. George Dobbs G3RJV and I’m definitely an old hand that’s been taught new tricks!”

My interest in radio or ‘wireless’ as I first knew it, began, when as a schoolboy, I made my first crystal set. Crude as it was, it worked. But I was more fascinated by the fact that I could, without seeing or hearing it, pluck this unseen force out of the air and turn it into speech or music.

My first copy of PW, if my memory serves me right, cost three old pence (about £1/2 new pence). The manuals of those days by F. C. Camm and J. Scott-Taggart were showing wireless sets where you had to screw the various components onto a wooden base-board.

War Work

World War Two started just about the time that I left school as a 15-year old, and I soon found myself put into war work. After that I eventually went into the army, so very little was done to further my hobby.

It was during the post-war years, with mountains of surplus equipment available, when my interest was first rekindled. And, I’m actually writing this story mainly with ‘old hands’ like myself in mind, who, when younger, would burn the midnight oil chassis-bashing!

Hack-saws, hammers and a hand-drill, were some of the tools needed in those days. You often ended up with the occasional hole in the kitchen table, but if the project worked, it was worth the effort.

Over the years, I have made many projects that appeared in PW. But as the years rolled by, my valved projects got fewer and farther apart, and to me it was the end of an era.

I did, however, have a go at a couple of simple transistor circuits from the ‘Take 20’ series that appeared in the 1960s. I must admit though, I wasn’t as enthusiastic as I was with valves.

Despite my fall-off in interest, I still got my PW every month, just so to keep up-to-date. Apart from the ancient magazines that can be seen in the doctor’s or dentist’s waiting rooms, it’s the only one I read. Strange isn’t it, that you never see copies of PW in the waiting rooms?

Back Issues

With the approach of winter last year, I found myself browsing through back issues of PW. My attention kept focusing on the ‘Getting Started - The Practical Way’ series by the Rev. George Dobbs G3RJV.

‘Why not give it a try?’ I thought, especially as I still have the skills that I’ve acquired over the years. Good fortune has also provided me with the steady hand that’s needed for this work.

Mind you, my eyes could do with replacement spectacles, I was well overdue for a new pair. So, what was I waiting for, ‘if you can’t beat ’em, join ’em’!

To date of writing, I’ve made the r.f. probe, the transistor tester and the multivibrator featured in the ‘Getting Started’ series. I didn’t have any problems in either the construction or testing.

However, I did go away from the general layout in the case of the multivibrator project. I used BC108 transistors instead of the specified BC183s, as apart from not having them to hand at the time, I remembered the BC108 being used in a similar PW circuit.

In fact, my transistors were salvaged. I’d recovered them from my junk box, and tested them on the transistor tester I’d just made!

When I started building the projects, I’d already decided to house them all in one box, rather than have three individual boxes. This is how I ended up with a plastics box measuring 180 x 100 x 75mm, with all the components mounted under the lid.

My wife spotted the project box as she passed me working in the kitchen. Her comment was “I don’t think you’ll get much more in there”!

However, with the test leads made up, I’m pleased with what I’ve built and how it looks. Yes, I think I am going to like transistors, so now to tackle integrated circuits!

You could say that I’ve been ‘converted’ by the Rev. George Dobbs! And I’m definitely an old hand that’s been taught new tricks!
December 13: Centre of England Christmas Rally will be held at the University of Hertfordshire, near the NEC, Birmingham, junction 6 M42. Opens 11.30am (11am for disabled visitors). Admission is £1, with a reduction for RAIC members. Over 60 traders in three large halls, ample parking, bar & restaurant facilities. Concessionary rates for those wishing to visit the museum. Talk-in on S22. Christmas Special - 'spot the cracker', which will be on many of the stands. Christmas Radio, Computer & Electronics & Communications Rally will be held at the NEC, Birmingham. Doors open 11am to 5pm. Talk-in from G1BRS on 144MHz S22. Amateur radio & computer traders, clubs & specialised groups. Refreshments. Admission £1, including free raffle ticket. Ian G2BDV on (0202) 886887.


May 16: The National Vintage Communications Fair will be held at the NEC, Birmingham. Doors open 10.30am to 5pm. Hundreds of items for sale, including vintage radios, telephones, gramophones, jukeboxes, radiograms, etc. Admission will be £3. Jonathan Hill on (0398) 331532.

May 30: Maidstone YMCA Radio Rally will be held at YMCA Sportscentre, Melrose Close, Maidstone, Kent ME15 6BD. Doors open 10.30am (10am for disabled). Entry is £1 per adult. Exhibition station G3XTRF (on h.f.). All-day video show for juniors. Refreshments & snacks available. Bring & Buy tables for hire. Brenda Puncher G0JJK on (0622) 850277.

WHAT YOU SEE IS WHAT YOU PAY: IF YOU Don'T SEE IT CALL: CREDIT CARDS WELCOME

Radio Diary

December 13: The Lancastrian Rally will be held at the University of Lancaster. Doors open 10.30am for the disabled. Sue G1OHN on (0524) 64238.

February 7: South Essex ARS Radio Rally will be held at The Pedddocks, Long Road (A130), Canvey Island, Essex. Doors open 10am. Trade stands, Bring & Buy, home-made refreshments, free parking. Parking outside main door for disabled visitors. Talk-in on S22. Ken Hendry G0BN on (0206) 755350.

February 27: Tyneside ARS 5th Annual Rally will be held at the Temple Park Leisure Centre in South Shields. All usual trade stands, free parking. Talk-in on S22. All the amenities of the Leisure Centre, including heated pool & gymnasium. Jack Pickering G0DZG on 081-265 1718.

March 13: The London Amateur Radio & Computer Show will be held at Picketts Lock Centre, Picketts Lock Lane, Edmonton, London N18. Large trade presence, free parking, lectures, disabled facilities, Bring & Buy, special interest group section. Talk-in on 144 & 430MHz. (0923) 678770.

March 28: Bournemouth Radio Society's 6th Annual Sale will be held at Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open 11am to 5pm. Talk-in from G1BRS on 144MHz S22. Amateur radio & computer traders, clubs & specialised groups. Refreshments. Admission £1, including free raffle ticket. Ian G2BDV on (0202) 886887.


April 26: The Bury (Lanchashire) RS Convention will be held at the Preston Centre, Monks Dale, Yeovil, Somerset. Featuring lectures, disabled facilities, Bring & Buy, special interest group section. Displays of home-made QRP equipment & vintage radio, on-air QRP stations & trade stands. Refreshments, doors open 9am, admission £1.50, talk-in S22. This convention is not a rally, but a convention for amateurs not only to attend interesting lectures on the theoretical & practice of low power communication, but also to meet other QRPers. There will also be the usual friendly QRP Contest on 3.5 & 7MHz, during the evenings of the previous week. This event is known as the QRP 'Funrun'. Peter Burridge G3CQR, 9 Drum Drive, Sherbourne, Dorset DT9 4HZ. Tel: (0935) 839354.

May 16: The 2nd National Vintage Communications Fair will be held at the NEC, Birmingham. Doors open 10.30am to 5pm. Hundreds of items for sale, including vintage radios, telephones, gramophones, jukeboxes, radiograms, etc. Admission will be £3. Jonathan Hill on (0398) 331532.

May 30: Maidstone YMCA Radio Rally will be held at YMCA Sportscentre, Melrose Close, Maidstone, Kent ME15 6BD. Doors open 10.30am (10am for disabled). Entry is £1 per adult. Exhibition station G3XTRF (on h.f.). All-day video show for juniors. Refreshments & snacks available. Bring & Buy tables for hire. Brenda Puncher G0JJK on (0622) 850277.
FOR SALE/WANTED/EXCHANGE

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FOR SALE

Roiei, integrated amplifier AR-2/2X3, tuner RM7150, radio; speakers, RM3140 Philips tuner V6110, monitor 19in V6560. Ferguson videocassette, Ross microphones R238A, A compatible system in g.w.o., offers. Tel: (043) 410256.


Yasueta FT-727RQ, h.f. transceiver with f.m. Boxed as new, £85. MA197 preselector, £85. RA137A i.f. converters. I44MHz/Amp, foffers. Tel: 031-647587.

Yaesu FT-746R, £400. Tel: Grimsby (0472) 322 6737. Yaesu FT-757GX with FP-700 matching power p&p. GORZI, Cumbria. Tel: (0946) 812092.

Trio TS505H, h.f. transceiver perfect running order, £85. Yaesu FT-7100, £150. JTL SX400 scanner, £75. Eddystone 640 in good order, £90. Or 870s. Tel: (07441 884022.

FOR SALE/WANTED/EXCHANGE

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BARGAIN BASEMENT ORDER FORM

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Please insert this advertisement in the next available issue of Practical Wireless Magazine.

I enclose Cheque/P.O. for £(2.35) made payable to Practical Wireless.

Name............................
Address............................

Access, Visa and Mastercard accepted
Card number............................
Expiry date of card............................
Signature............................
Subscription Number (free ad for subscribers) (12)

A photocopy of this form is acceptable, but you must still send in this corner flash as proof of purchase.

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FOR SALE/WANTED/EXCHANGE

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A Bargain Basement is a column in Practical Wireless magazine where readers can advertise items for sale, wanted, or exchange. The column is designed to facilitate transactions among hobbyists and collectors, particularly in the fields of radio and electronics. The advertisements typically include details such as item descriptions, prices, contact information, and sometimes contact preferences. The column is open to all, but some advertisements may require prior approval by the magazine's editorial staff. The goal is to provide a platform for enthusiasts to buy, sell, or trade items related to their interests, fostering a community spirit of sharing and交换. The column is often sponsored or highlighted in the magazine, which can help increase visibility and attract more advertisers. The content is usually organized in a structured format, including headings, categories, and standardized information for easier readability and navigation.
Common German Christian names

It is easier to recognize them in the QRM if you have seen them before. These are some of the names which have been popular at different times over the last 60 years. Names whose spelling is identical to English names (e.g., Peter or Barbara) have not been included. Variants and diminutives are given in brackets.

Male Names
- Andreas
- Bernd
- Dieter
- Erich
- Ernst
- Fritz
- Franz
- Gerhard
- Gunter (Gunther)
- Hans
- Hermann
- Heinz
- Helmut (Hellmut)
- Joachim (Jochen)
- Jurgen
- Klaus
- Kurt
- Lothar
- Manfred
- Mathias (Matthias)
- Norbert
- Rainer
- Rudolf (Rudi)
- Stefan
- Udo
- Ulrich (Uli)
- Werner
- Wolfgang

Female Names
- Angelika
- Beate
- Bettina
- Birgit
- Brigitte
- Dagmar
- Elke
- Franziska
- Gerda
- Gisela
- Gudrun
- Hannelore
- Helga
- Hildegard (Hilde)
- Inge
- Ingrid
- Ilse
- Marlies
- Petra
- Regine, Regina
- Renate
- Sabine
- Sigrid
- Silke
- Susanne
- Ulla, Uschi (both short for Ursula)
- Ulrike
- Ute

Days of the Week

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<td>vierundsechzig</td>
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<td>sechsundsechzig</td>
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<tr>
<td>100</td>
<td>hundert</td>
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<tr>
<td>101</td>
<td>einhundert</td>
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<tr>
<td>102</td>
<td>zweihundert</td>
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<tr>
<td>103</td>
<td>dreihundert</td>
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<td>104</td>
<td>vierhundert</td>
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<td>105</td>
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<td>106</td>
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<tr>
<td>107</td>
<td>siebenhundert</td>
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<tr>
<td>108</td>
<td>achtundachtzig</td>
</tr>
<tr>
<td>109</td>
<td>neunundachtzig</td>
</tr>
</tbody>
</table>

The German Alphabet

This is used to give the Q code and also for callsigns.

The German Alphabet

A
B
C
def
E
tyot (Austrian:.Key)
F
gay
G
H
I	rae
J
K
L
M
N
O
P
Q
R
S
day
T
tay
U
V
W
X
Y
eupsilon
Z
tset

Time

Day

Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Sunday

Next month we start another language, learn those QSOs in French!
In this final part of 'Basic QSOs In German', Gareth Roberts GW4JXN, lists many useful names and items commonly found in amateur radio conversations. For those who have some knowledge of German there follows a list of the most common technical words and phrases.

<table>
<thead>
<tr>
<th>English</th>
<th>German</th>
</tr>
</thead>
<tbody>
<tr>
<td>absorption wavemeter</td>
<td>der Absorptionswellenmesser</td>
</tr>
<tr>
<td>ammeter</td>
<td>das Amperemeter</td>
</tr>
<tr>
<td>amplifier</td>
<td>der Verstarker</td>
</tr>
<tr>
<td>amplitude modulation</td>
<td>die Amplitudenmodulation</td>
</tr>
<tr>
<td>antenna</td>
<td>die Antenne</td>
</tr>
<tr>
<td>antenna tuning unit</td>
<td>das Antennen-Abstimmgerat</td>
</tr>
<tr>
<td>balun</td>
<td>der Balun</td>
</tr>
<tr>
<td>beam</td>
<td>der Beam</td>
</tr>
<tr>
<td>calibrator</td>
<td>das Eichgerat</td>
</tr>
<tr>
<td>carrier</td>
<td>der Trager</td>
</tr>
<tr>
<td>coaxial cable</td>
<td>das Koaxkabel</td>
</tr>
<tr>
<td>coil</td>
<td>die Spule</td>
</tr>
<tr>
<td>condenser</td>
<td>der Kondensator</td>
</tr>
<tr>
<td>cross modulation</td>
<td>die Kreuzmodulation</td>
</tr>
<tr>
<td>deviation</td>
<td>die Abweichung</td>
</tr>
<tr>
<td>dial</td>
<td>die Skala</td>
</tr>
<tr>
<td>directional antenna</td>
<td>die Richtantenne</td>
</tr>
<tr>
<td>disturbance</td>
<td>die Storung</td>
</tr>
<tr>
<td>dummy load</td>
<td>die künstliche Antenne</td>
</tr>
<tr>
<td>the earth</td>
<td>die Erde</td>
</tr>
<tr>
<td>to earth</td>
<td>erden</td>
</tr>
<tr>
<td>earthed</td>
<td>zu Erde/geerdet</td>
</tr>
<tr>
<td>fading</td>
<td>das Fading/der Schwund</td>
</tr>
<tr>
<td>feeder</td>
<td>die Verbindungsleitung/das Antennenkabel</td>
</tr>
<tr>
<td>to test</td>
<td>abstimmen</td>
</tr>
<tr>
<td>final stage</td>
<td>die Endstufe</td>
</tr>
<tr>
<td>fixed</td>
<td>fest</td>
</tr>
<tr>
<td>frequency modulation</td>
<td>die Frequenzmodulation</td>
</tr>
<tr>
<td>fuse</td>
<td>die Sicherung</td>
</tr>
<tr>
<td>ground wave</td>
<td>die Bodenwelle</td>
</tr>
<tr>
<td>high-pass filter</td>
<td>das (der) Hochpassfilter</td>
</tr>
<tr>
<td>indoor antenna</td>
<td>die Zimmerantenne</td>
</tr>
<tr>
<td>insulator</td>
<td>der Isolator</td>
</tr>
<tr>
<td>ionosphere</td>
<td>die Ionosphäre</td>
</tr>
<tr>
<td>jack</td>
<td>die Buchse</td>
</tr>
<tr>
<td>lightning protection</td>
<td>der Blitzschutz</td>
</tr>
<tr>
<td>line of sight</td>
<td>auf Sichtweite</td>
</tr>
<tr>
<td>lower sideband</td>
<td>das untere Seitenband</td>
</tr>
<tr>
<td>low-pass filter</td>
<td>das (der) Tiefpassfilter</td>
</tr>
<tr>
<td>metal case</td>
<td>das Metallgehäuse</td>
</tr>
<tr>
<td>meter</td>
<td>das Messgerät</td>
</tr>
<tr>
<td>modulated wave</td>
<td>die modulierte Welle</td>
</tr>
<tr>
<td>omnidirectional antenna</td>
<td>die Rundstrahlantenne</td>
</tr>
<tr>
<td>operator</td>
<td>der Funker</td>
</tr>
<tr>
<td>parasitic oscillations</td>
<td>parasitare Schwingungen</td>
</tr>
<tr>
<td>plug</td>
<td>der Stecker</td>
</tr>
<tr>
<td>power supply unit</td>
<td>das Netzteil</td>
</tr>
<tr>
<td>preset</td>
<td>voreingestellt</td>
</tr>
<tr>
<td>preset potentiometer</td>
<td>der Trimmer</td>
</tr>
<tr>
<td>pulse modulation</td>
<td>die Impulsmodulation</td>
</tr>
<tr>
<td>radiate</td>
<td>strahlen/abstrahlen</td>
</tr>
<tr>
<td>the range</td>
<td>die Reichweite</td>
</tr>
<tr>
<td>readability</td>
<td>die Lesbarkeit</td>
</tr>
<tr>
<td>receiver</td>
<td>der Empfanger</td>
</tr>
<tr>
<td>repeater</td>
<td>der Umsetzer/die Relaisstation</td>
</tr>
<tr>
<td>r.f. amplifier</td>
<td>Der HF-Verstarker</td>
</tr>
<tr>
<td>rotating antenna</td>
<td>die drehbare Antenne</td>
</tr>
<tr>
<td>rotator</td>
<td>der Rotor</td>
</tr>
<tr>
<td>satellite</td>
<td>der Satellit</td>
</tr>
<tr>
<td>selectivity</td>
<td>die Trennscharfe</td>
</tr>
<tr>
<td>sensitivity</td>
<td>die Empfindlichkeit</td>
</tr>
<tr>
<td>shielded cable</td>
<td>die abgeschirmte Litze</td>
</tr>
<tr>
<td>short circuit</td>
<td>der Kurzschluss</td>
</tr>
<tr>
<td>sideband</td>
<td>das Seitenband</td>
</tr>
<tr>
<td>skip zone</td>
<td>die Tote Zone</td>
</tr>
<tr>
<td>sky wave</td>
<td>die Raumwelle</td>
</tr>
<tr>
<td>sound frequency</td>
<td>die Tonfrequenz</td>
</tr>
<tr>
<td>splatter</td>
<td>der Splatter</td>
</tr>
<tr>
<td>standing wave</td>
<td>die stehende Welle</td>
</tr>
<tr>
<td>switch</td>
<td>der Schalter</td>
</tr>
<tr>
<td>to test</td>
<td>abstimmen</td>
</tr>
<tr>
<td>transceiver</td>
<td>der Transceiver</td>
</tr>
<tr>
<td>transistor</td>
<td>der Transistor</td>
</tr>
<tr>
<td>transmitter</td>
<td>der Sender</td>
</tr>
<tr>
<td>troposphere</td>
<td>die Troposphäre</td>
</tr>
<tr>
<td>tuned circuit</td>
<td>der Schwingkreis</td>
</tr>
<tr>
<td>to tune up</td>
<td>abstimmen</td>
</tr>
<tr>
<td>upper sideband</td>
<td>das obere Seitenband</td>
</tr>
<tr>
<td>valve</td>
<td>die Röhre</td>
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<tr>
<td>variable</td>
<td>veränderlich/variabel</td>
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<tr>
<td>vertical antenna</td>
<td>die Vertikalantenne</td>
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<tr>
<td>voltmeter</td>
<td>das Voltmeter</td>
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<tr>
<td>wavelength</td>
<td>die Wellenlänge</td>
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<tr>
<td>wavemeter</td>
<td>der Wellenmesser</td>
</tr>
<tr>
<td>Yagi</td>
<td>der Yagi</td>
</tr>
</tbody>
</table>

The pronunciation is not given.
Practical Wireless, January 1993

"ECONOMICAL & EFFECTIVE" that's the NEW FT890 from YAESU

Blending the high performance digital frequency synthesis techniques from the FT850 and FT1000, the FT890 adds a built-in (or optionally remote) automatic antenna tuner and a wealth of convenient functions for compact base, home and mobile stations. The FT890 sets the new performance standard. Blending the high performance digital frequency synthesis techniques from the FT850 and FT1000, the FT890 adds a built-in (or optionally remote) automatic antenna tuner and a wealth of convenient functions for compact base, home and mobile stations. The FT890 sets the new performance standard.

Both Chris Lorek and Peter Hart agree the FT890 has "extremely versatile performance" and is "easy to use with plenty of useful features". All in all a Winner!

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- LW14/2M 16 x Die Yagi 59.46
- PBM10/2M 10 x Die Parabeam 82.84
- PBM14/2M 14 x Die Parabeam 98.23
- QA4/2M 4 x Die Quad 52.05
- QA6/2M 6 x Die Quad 67.68
- QA8/2M 8 x Die Quad 84.37
- DS4/2M 5 over 3 slot Yagi 47.99
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- SX4/2M 5 x Die Crossed Yagi 50.53
- SX6/2M 6 x Die Crossed Yagi 64.51
- UXV2M 10 x Die Crossed Yagi 80.84

2m/70cm
- 6Y/12Y 6 x 2m, 12 x 70cm Yagi 72.67

70cm
- CS70 Coaxial 132.19
- 5B6/70 5 over 8 slot Yagi 47.71
- 8M2A/70 8 over 12 slot Yagi 75.67
- MM28/70 28 x Die Multibeam 38.54
- MS48/70 48 x Die Multibeam 61.57
- MBM8/70 8 x Die Multibeam 85.89
- SX8/70 8 x Die Crossed Yagi 74.03
- UXV70 12 x Die Crossed Yagi 91.77

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- DI5/24 15 over 15 slot 80.72

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Theory

Using Those Versatile Vacuums

Part 2

In the second and final part of his look into the world of valves and valved equipment technology, Phil Cadman G4JCP provides useful tips on where to find old equipment. Finally, Phil takes the mystery out of the rather puzzling subject of valve reference numbers.

Following the first part of my look at using those ‘versatile vacuums’ in the October PW, I’m going to take a look at scrounging. In my early days in the hobby, this was the best means of maintaining a vigorous junk-box.

Funnily enough, in those days, most people contributed to my junk-box with a glad heart. They were only too pleased for someone to take their old radio and TV receivers off their hands. After all, it saved them a trip to the rubbish dump!

However, if you are intending to work on the design of valved equipment, rather than the odd bit of construction, a well-filled junk-box is even more essential than it was 20 years ago. The main reason is the lack of easily-available off-the-shelf components.

Prudent Purchases

Prudent purchases at rallies and other events may pay dividends, especially if they’re used later. However, being realistic, a proportion of the stuff you collect will probably never be used.

When you do have a clear-out, don’t forget others may benefit. It’s best to advertise your surplus junk.

At this point, I’m going to appeal to any old-timers who may be thinking of disposing of their precious collection of junk. Please remember those valve enthusiasts who are just starting off.

Don’t forget also, that you’ll be able to help in other ways too. Your accumulated knowledge will be invaluable, provided that those young whipper-snappers will listen. So, all you experienced types, please try to pass your knowledge on.

Equipment For Dismantling

Now, it’s time for a list of suitable valved equipment for dismantling. In preparing the list, I’ve considered the value of the components the various items mentioned might contain.

Unfortunately (or fortunately, depending on the way you look at it) a lot of older equipment is actually worth more, ‘intact’ to a collector, than the components it contains. With this in mind, I’ve provided some advice on what not to dismantle, no matter how useful the innards may be!

Mains radio receivers were once a lucrative source of components, the situation is now complicated by their value to collectors. Don’t dismantle any radio that was made before the mid 1950s, unless it’s literally falling apart.

Radios from the late 1950s and the first half of the 1960s, may be worth something, particularly if they’re in good condition. Even if they they’re not especially collectable, radios from this period invariably sound better than their successors, mainly because of the larger cabinets and generous audio output.

You could always use one of the older receivers in the shack to listen to the news! But, if you have a radio where the cabinet is really poor, or it has a major fault, I’d suggest that you could then start dismantling it for spares.

Mains Transformer

Unless the radio you’re dismantling is an a.c./d.c. model, the first item to go for (after you’ve removed the valves) is the mains transformer. Then you should remove the audio output transformer and the tuning capacitor.

The next stage is to remove what you can! But, beware of the smoothing capacitors and any paper capacitors, for the safety reasons I’ve already mentioned in part I, published in October.

Don’t take any risks. The circuit and advice in Fig. 4, in the October PW, will reform and test electrolytic capacitors.

Phil Cadman G4JCP says that you can still enjoy using valves, and find many jobs for those versatile vacuums in your shack.
There are a great number of valve bases, and some were very specialised and are now rarely seen.

Warning: Be very careful with electrolytic capacitors rated for use at 200V or more, and especially if they have not been in use for some time. Such capacitors can explode with great violence, creating havoc within equipment and possible injury to you! It’s always a good idea to re-form capacitors, and this can be done by placing a 15-20W 250V bulb in series with the capacitor and the h.t. supply. If the capacitor is literally a short-circuit (which they can be) the bulb will illuminate. If the capacitor is in order, reforms or becomes less ‘leaky’, the bulb filament will gradually become less bright, and will eventually extinguish. After a final check to see that the leakage current is within the h.t. supply’s capability, you can use it quite safely.

Salvaging Resistors

It’s hardly worth salvaging resistors, particularly if they’re of the old carbon composition type. Wire-wound resistors however, are a different matter. Unless wire-wounds have been damaged physically or overheated, they’re certainly worth keeping.

Even a collection of mains-droppers, salvaged from old a.c./d.c. receivers, can be useful. They can, for example, be made into made into a dummy load, for testing power supplies.

Valves And Holders

If the radio you’re breaking up uses valves, other than types with octal and B7G/B9A bases, it may be worth taking the trouble to salvage the holders. These won’t necessarily be for use in projects, but they can provide useful spares for repairing other elderly or restorable equipment.

The valves used in radios, by the way, fall broadly into two groups, those from equipment with mains transformers and those from a.c./d.c. sets.

For our purposes, valves from equipment using mains transformers are by far the most useful. This is because they’ll have 5 or 6.3V heaters (filaments) and characteristics optimised for 250 - 350V h.t. supplies.

Valves designed for use in a.c./d.c. equipment will probably have heaters that require 100mA. Unfortunately, this means that the heater voltage will vary from valve to valve and be relatively high when compared to the 6.3V heater valve.

There’s another problem in using valves designed for a.c./d.c. circuits. This occurs because they will have had their characteristics optimised for h.t. supplies operating between 170 and 250V.

Using valves designed for a.c./d.c. use, can prove difficult because of their awkward heater requirements, unless you want to employ one or maybe two. In this case, a low voltage transformer can provide the necessary heater supply.

Battery Receivers

Another interesting source of valves, are those from ‘all dry’ battery-powered radios. Almost all battery radio receivers are worth keeping, if they’re in good condition.

Spares for 90V h.t. and 1.5V heater valve-equipped receivers are virtually unobtainable. So, it’s a good idea to keep a spares box.

You may even be lucky enough to find a ‘mains eliminator’. These were, at one time, a popular alternative to the (always expensive) all-dry batteries.

Fortunately, you don’t have to wait for luck to bring you a suitable supply, because PW has published a circuit! The ‘Power Supply For Battery Radio’, designed by Stefan Niewiadomski, is ideal for the job and was published in May 1990, and there’s a p.c.b. available for the project.

General Advice

I had better end up with some general advice, and old TV receivers are a good source of valves, if nothing else! However, almost all the valves are for a.c./d.c. use.

Fortunately, there are some very useful types of valves in older TV sets. These include the EF80, and the ECC81/82/83 double-triodes.

You’ll also find the ECC80, triode/output pentode. This 6.3V 300mA heater valve is very useful in QRP transmitting projects.

Look out for the EF85/EF183 and EF184 valves. When used carefully (because of the high gain they provide) the EF183 and 84, in particular, can be very useful.

Mains powered tape recorders are a particularly good source of spares. Fortunately, older tape recorders don’t seem to be so collectable (at the moment) and they are easily obtainable to break down for transformers, valves and good quality audio components.

Record-players and radiograms can also be a good source. Your decision to dismantle, must depend on the condition of the equipment. They might become really collectable!

High Fidelity Equipment

When it comes to valved high fidelity equipment, my advice is that you put the screwdriver away! The rule, when it comes to such equipment, must be ‘leave it alone’.

The value of valved audio equipment varies, and depends on who made it. But the general rule is that it’s usually worth more intact, than as spares. Leak, Radford and especially Quad valve amplifiers, are worth more than their original list prices.

Valves using the B9A base (pictured here) along with the slightly smaller B7G base versions, are still very much in use today. Such valves, especially the EF183 and EF184, can provide excellent results.

Examples of specialised disc-sealed valves, rarely used in amateur radio, but they make interesting mantel piece ornaments!
Start Collecting

So, it's time for you to start collecting! Look out for bargains at rallies and events, and you'll soon be in business.

With just a little care, you can find the bargains. For example, you'll see good quality oil-filled transformers and capacitors about. But be careful and check these for leaks.

If any oil-filled component is leaking, or feels oily, don't buy it. I don't know of any way of identifying the dangerous pollutant insulating (PCB) oils, so it's best to avoid suspect transformers or capacitors.

Apart from that final warning, my advice is to get out there, start working and using those versatile vacuums and having fun. After all, there's a lot of valves waiting to be used! It will be a terrible shame if we preserve the artifacts of the valve era, without making some attempt to record the knowledge that accompanied them.

PW

Valve Identification And Coding

Many valve data books include information on how valves are identified, so I'll not go into any great detail here. What follows will get you by, until you are familiar with the identification systems used by the various manufacturers.

American Valves

1st number(s) - approximate heater voltage.
suffix G - glass, some early valves were metal-cased and had no suffix, the G was added to distinguish the glass version.
suffix GT - glass, but with slim-line, tubular shape.

Example 5Z4G

5 - 5V heater
Z4 - identification
G - glass, old bulbous shape.

In a nutshell, the valve number is not a great deal of help. Best to get an equivalents book or a data book that covers American valves.

British valves - Mullard system.

1st letter heater voltage or current
D 0.5 to 1.5V
E 6.3V
G 5V
P 300mA series connection
U 100mA series connection

2nd and subsequent letters - class
A diode
B double diode
C triode
F pentode
H hexode (or heptode)
K heptode
L output pentode or tetrode
M magic eye indicator
Y half-wave rectifier
Z full-wave rectifier

Two or three letters may be combined, indicating two or three valves in one envelope.
e.g.
CF triode pentode
ABC triple diode (single diode plus double diode) triode

1st digit base type
2 B10B (also was used for BRG base)
3 octal
4 B8A
5 B9D
8 B9A
9 B7G

2nd and subsequent digits - variant
Examples ECC83 and PL36

E 6.3V heater
CC double triode
8 B9A base
3 variant
P 300mA heater
L output tetrode
3 octal base
6 variant

Where the class letters are transposed with the numbers, for example ECC88 becoming E88CC, this indicates a special quality type. The two are normally interchangeable, but some slight differences are to be expected in the characteristics.

British valves - Mazda.

1st digit heater voltage or current
1 1.4V
6 6.3V
10 100mA series connection
20 200mA series connection
30 300mA series connection

2nd and subsequent letters - class
C frequency changer
D diode(s)
F tetrode or pentode
FD tetrode or pentode with diode(s)
FL tetrode or pentode with triode
L triode(s)
LD triode(s) with diode(s)
M magic eye indicator
P output pentode or tetrode
PL output pentode or tetrode with triode
U half-wave rectifier
UU full-wave rectifier

Final number - variant

Example
30PL1
30 300mA series heater for series connection
PL output tetrode with triode
1 variant (obviously the first in this case)

One important point to note concerns Mazda-octal based valves. Mazda-octal is not the same as normal octal (international-octal) although at first glance they look the same. Mazda-octal valves have, apart from Mazda written all over them, a thicker central spigot than international-octal valves and the pins are not quite equi-distantly spaced. It is worth salvaging one or more Mazda-octal valveholders if you need a replacement. Despite what I have just said, by the 1960s, Mazda-octal based valves had effectively died out. Mazda meanwhile went about producing international octal based valves. So, not every Mazda valve with an octal base is a genuine Mazda-octal, you still have to look for yourself.

There are a few other systems attributable to both the manufacturers I have mentioned above and to those I have not. However, none are as informative and so I feel they are not worth mentioning here.

Practical Wireless, January 1993 55
Reliable communications, over great distances, unconnected by wires, is what the subject of 'wireless' is all about. From the beginning, with a spark transmitter and coherer detector, the armed forces have taken a great interest in the subject.

Under battle conditions the need to transfer information swiftly and clearly between two stations, before the enemy can 'listen in', is of the utmost importance. Many years ago, I had the opportunity of talking to veterans of the First World War, and learnt about their experiences with both wireless and land-line communications.

In the 1914-18 war, a small Marconi spark transmitter was used in the air by Royal Flying Corps observers. They reported (by Morse code) the positions of German artillery to the army below.

The ground station was often manned by a soldier listening on a robust, wooden-cased 'crystal-set', like the Johnson and Phillips MkIII tuner. They didn't have the luxury of two-way communications by wireless, so the land operator would acknowledge the message by waving his hand or a flag.

Referring to the RFC in December 1939, the late John Clariccoats wrote, 'The chief job of the 1915-1918 wireless operator was to act as 'the ears' between a flying plane and the battery to which he was attached.

His equipment was primitive (usually a MkIII tuner) and his only means of communication with the observing machine was by means of 'white' ground strips which, sad to relate, seldom lived up to their name.'

A great deal was learnt by the military about wireless (soon after called radio) communications during that conflict. They particularly realised the need to have a civilian reserve of trained engineers and telegraphists.

Between the wars, the art of radio developed rapidly. By 1939 it was in daily use on land, sea and in the air for communications, navigation, science and international broadcasting.

On the technical side, the thermionic valve had replaced the spark-gap, coherer and crystal detector at the 'heart' of both transmitter and receiver. However, the majority of transmissions were then on frequencies below 20MHz.

Many of the lower frequency bands became 'cluttered', and were subject to man-made and natural interference. Although extensively used, these 'long' wavelengths were not really ideal for short-range air-to-air and air-to-ground conversations.

**Early Tests**

Early tests above 30MHz, suggested that the clarity of the v.h.f. bands was the answer to relatively 'local' contacts. The higher frequencies had the added advantages of smaller antennas and lighter and less current-hungry equipment.

These factors made v.h.f. operation very attractive for airborne use. But, before this could be proved, much experimental work with new ideas, constructional techniques, valves, components and antennas had to be done.

In my view, a large amount of the credit for pioneering v.h.f. communications in the air must go to a particular dedicated group. The group consisted of pre-war radio amateurs, the Daily Herald newspaper and the magazine Popular Wireless.

The tests started in May 1933, when signals on 56MHz were transmitted from an amateur station installed at the top of the North tower of London's Crystal Palace. They were successfully received some 209km away by a Daily Herald reporter with a receiver installed in a Puss Moth aircraft.

The plane, charted by the Editor for the occasion was flying at 10 000ft "somewhere North of the Wash". The 'Palace' signal may well have exceeded this range, but the pilot had to turn back due to a shortage of fuel.

The group built on their success, because, a few weeks later, two De Havilland Dragon-Moths, carrying transmitters and receivers for 56MHz were again chartered by the papers. Once these planes were in the air, two-way communication was soon established between them and, as the flight proceeded, with other amateur stations on the ground.

A great deal was learnt about the behaviour of v.h.f. signals through amateur activity on 56MHz. There was also the bonus of hearing and identifying the 'hissing' noise from the active sun in July 1938 and June 1939.

The development of valves like the 'acorns', EA30, EP30, RK34, RL17 and SP61 in the late 1930s helped. These valves made it possible for RAF fighters, from about 1942, to work air-to-air and air-to-ground on higher frequencies between 100 and 124MHz.

The pre-1939 work on 56MHz, is a classic example of the radio enthusiast's ability to come up with ideas to produce and tackle the 'impossible' at low cost. Another typical case, comes from John Tye (Dereham) who has built a Scott-Taggart ST300 broadcast receiver from original components that he had preserved from days gone by.

Among his problems was the reproduction of the high tension and grid bias batteries, and the low tension accumulator.

Congratulations are due to John for the following answers. First of all, having a poser-size print made from a photograph of an original battery, and cutting out the labels to make up the dummy.

Secondly, of course for building up the set itself, Fig. 1, but, take a look at the Ever Ready GB battery between the two valves on the left. The label came from a valve box and the frame work is a cut-down video-tape box. Thirdly, for a realistic looking accumulator, Fig. 2, "A cut-off coffee jar and wood plates, hi." Obviously the set will be powered from 'hidden' sources.

**Wartime Radio Masts**

In the October PW, I mentioned the two wooden radio masts, relics from the Second World War, located on an iron-age hill-fort, known as the Trundle, on the South Downs near Chichester. This prompted an interesting letter from Jack Hasling (Rustington) who worked on a similar site, while serving in the RAF. He told me that such masts, Fig. 3, were about 27m high and carried four vertically polarised dipoles, on cross arms, for v.h.f. communications.

Jack kindly sent a sketch of the array that he remembered from which I made a drawing, Fig. 4. The original operating frequency was in the 100-124MHz range, but when in the post war years, the 'airband' was extended to 156MHz, the dipoles were changed to the broad-band 'cage' type, Fig. 5.

"I expect the Trundle masts provided the v.h.f. communications for Tangmere aerodrome," said Jack. He reckoned that the equipment most likely used, would have been the same as it was at his station, the R1132A receiver and T131 transmitter.
"We were the next v.h.f. site east of Tangmere" and "when I climbed our receiver mast (and stood like Eros on top of it)!! I found, scratched in the woodwork at the top an 'admission' by a WAAF that on the date given, she had climbed the mast and left her autograph!" wrote Jack. "Brave girl" he remarked and continued: "the masts were climbable using footholds sticking out on telegraph poles."

Among the photographs I took when Joan and I visited the site on July 12 was one looking up inside the mast from the bottom, Fig. 6. This shows the base of the upper platform and the footholds sticking out on the lower left. At Joan's suggestion, Fig. 6 was taken deliberately for the 'odd angle' section of a local photograhic competition. It won first prize and made me £1 richer, hi!

Talking Calculator

The time had come for me to replace my 20-year old desk calculator and I chose Tandy's 'Talking Calculator' seen in Fig. 7. Its convenient size (approximately 177x130x30mm) and shape appealed to me, as did the 54x20mm liquid crystal display and the relatively large keys. The instrument is powered by two 'AA' batteries and the unit is switched on and off by the respective green buttons, below the memory keys, at the lower right. The speech emitted from the

```
35x14mm speaker grill, top right, is 'clean' and distinct.
The adequate volume of speech is controlled by a three-position switch just below the display. For example if you press 9 x 3 = 27, the voice synthesis says 'nine times three equal twenty seven'.
Press 'AC' and it says 'all clear', 'M+' and it responds 'memory plus' and there is yet another option, say an answer to a sum is 738, it will say 'seven three eight' or by changing a command, 'seven hundred thirty eight'.
Of course as the symbols '+','-', '÷' and '%' are pressed the machine replies 'plus', 'minus', 'point' and 'percent' respectively and there is a 'REP' key, next to the 'off' button, to repeat the answer. This calculator retails for £19.95 and is no doubt available from your local Tandy store.
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Variety Of Calculators

Like many people in the late 1960s and early 1970s, I worked my way through a variety of electronic calculators, simply because each one had more functions than its predecessor. My mind naturally turned toward computers, so I began with a magazine on the subject.

Now, after 17 years of using a computer, I still find these specialist journals, like PW, an excellent source of learning and advertising material. In recent years most magazines, dedicated to the 'PC', carry a free disc with 'try-out' programs, on the front cover. For instance, I found a very good astronomy program, called Sky Globe, on the disc given with the October issue of Personal Computer World.

Observations

During August, Ron Livesey (Edinburgh), using a 2.5m refractor and a 4.0m projection screen, located three active areas on the sun's disc on days 1, 5, 6, 7, 10, 11, 12, 13, 14 and 23rd, and four on the 3, 4, 16 and 17th. Early reports for September came from Cndr Henry Hatfield (Seventoaks) and Patrick Moore in Selsey.

Henry, using his spectrohelioscope, identified one sunspot group with an active plaque, seven filaments and seven small quiescent prominences on the sun at 1410 on the 5th. Patrick projected the sunspot group seen in Fig. 8 on to his screen at 1350 on the 7th. In addition, on the 5th and 6th, Henry's radio telescopes recorded individual bursts of ('hissing') solar radio noise at 136 and 1297MHz.

Auroral Reports

Now it's time to start the reports, and we start off with auroral. "Much magnetic and radio-aurora activity on September 9/10 following upon high solar radio wave emissions reported by Patrick Hardie on the 6th.," wrote Ron Livesey in a 'Stop Press' section of his August report to the British Astronomical Association.

My thanks to Ern Warwick (Plymouth) for the reminder that the German propagation beacon DK0WCY, situated 20km South of the Danish border, often transmits auroral warnings on 10.144MHz.

Magnetic

On to magnetic observations now. The various magnetometers used by Ron Livesey, Karl Lewis (Saltsash) and David Pettit (Carlisle), between them, recorded magnetic 'storm' conditions on August 4, 21, 22 and 23rd.

Meteor Display

Last month, I talked about meteor particles burning-up in the earth's atmosphere, giving a wonderful display of bright lights darting across the night-sky. The meteor activity brought a response from an interested reader. My thanks to Andrew Jackson (Birkenhead) for a copy of a piece in the Daily Post of August 18 which began, "Reports of brilliant white flashes of light and strange objects in the sky prompted a barrage of calls from anxious people across the North West."

The paper referred to a similar article they did almost to the day 36 years ago, in 1956, when "a falling meteor lit up the Merseyside coastline, brightly illuminating it for several seconds." Such press-items are valuable to researchers because the event was reported by people who were there at the time and able to give a first-hand account of what they saw.

I passed Andrew's cutting to Dr. John Mason, the President of the British Astronomical Association, who told me that over 200 reports had reached Howard Miles and himself about a fireball at 2150 on August 16. There was a "major fireball track line stretching from Merthyr Tydfil, across Anglesey, over the Irish Sea and terminated off Kintyre," said John.

Howard and John are part of the BAA's fireball survey team and they soon learnt that this one had been observed as far afield as Aberystwyth, Anglesey, Arbroath, Birmingham, Borders, Cardiff, Glasgow, Merseyside, Oban, Oxford, Pembroke, Sheffield and Wigtown.

Sonic booms were heard two or three minutes after the fireball was seen and the ground was illuminated like daylight in parts of Wales, were among the reports. "It appeared so large in the sky that many people thought it was closer than it was," said John.

As you've probably read in 'Keylines', this is the last 'Reflections' column, and I hope you have enjoyed the series. However, I also hope you'll enjoy my 'Valve & Vintage' spot as from the February issue of PW.

Reflections
KENWOOD TH-78E (Dual-band)
This compact 144MHz-430MHz transceiver sets exciting new standards for handportable fans by combining simplicity and sophisticated features. Built-in DTSS, paging functions, alphanumeric memory, 3 power levels, battery-save, auto-dialling, power-off and message paging are amongst the many functions included. The TH-78E also provides a dual-frequency receive capability (including VHF+VHF and UHF+UHF) plus double-band scan. The keypad has a sliding cover to protect any data stored.

ICOM IC-W2E (Dual-band)
A return to basic design fundamentals achieving the right size/features ratio, has produced this truly unique and compact FM transceiver from ICOM. Perfect, simultaneous dual-band receive is easy even while transmitting on another band. A 3-way tuning system allows fast selection of frequency or memory channels using top panel control, digit keys or up/down keys. 60 memory and 2 call channels make the IC-W2E a most versatile and market-leading transceiver. Visit your Hamstore today and make the ultimate choice.

ALINCO DJ-580E (Dual-band)
This compact transceiver has 40 memory channels with MCF to allow intermixing of memory channels on either VHF or UHF bands. A super-low battery consumption function activates automatically when less than 5 volts is available, this allows continuous operation until battery falls below 3.8 volts. Full duplex, dual-watch, independent VHF, UHF controls, DTMF squelch, 8 scanning modes, auto-dialer, 3 power levels, battery-save, illuminated keypad and DSQ wildcard function are just a few of the many features available on the DJ-580E.

TOP BRAND MONO & DUAL-BAND MODELS TO MAKE AN IDEAL CHRISTMAS GIFT.
We also stock items by AEA, AKD, Alinco, AOR, Barenco, CDE, Comet, Cushcraft, Dee Comm, Diamond, Drae, Hills Kits, Hustler, Icom, JRC, Kenwood, Lowe, MFJ, Sony, Toyo, Yaesu, Yupiteru etc. Second-hand and ex-demo equipment is always available.

Payment by Access, Visa and Switch. Part-exchanges welcome, finance arranged (subject to status). Interest free credit on selected new ICOM products. If you cannot visit an ICOM HAMSTORE in person, use our efficient Mail Order Service. Stock items normally dispatched within 24Hrs.

As always we offer full warranty on from the many authorized dealers within UK, be replaced if the fault is deemed beyond service. ICOM equipment purchased from an unauthorized ICOM warranty.

Gordon G3LEQ & John G8VIQ at Birmi and Doug G0LUH & Paul G7MNI in London all Communicative New Year!
ICOM IC-P2ET/P4ET (mono)

ICOM present two new ultra-compact and multi-functional handhelds; P2ET for 144MHz and P4ET for 430MHz operation. ICOM’s newly developed Al (Artificial Intelligence) provides perfect operating flexibility by adapting to your operating style. Each time a secondary function is activated, the Al learning function assigns it to the Al key, making it convenient for accessing previously used functions. Features include: optional pager, code squelch, pocket beep, triple tuning, auto-dialling, keypad and PTT lock. Ergonomic design also helps to make these two radios a pleasure to use. Visit your Hamstore to learn more about this exciting new development.

ICOM IC-2SRE/4SRE (mono)

Until today, you needed to carry a transceiver and a wideband receiver to enjoy full QSO and wide-band receiving. Now ICOM present the 144MHz (2SRE) or 430MHz (4SRE) to enable full 50-905MHz wide-band receive. FM broadcast, TV audio, Airband and Marine VHF plus more AM, FM or wide-FM frequencies can now be easily monitored with one fabulous radio. Imagine listening to TV audio or FM radio while waiting for a Ham call, interesting isn’t it!

ICOM IC-2IE/4IE (mono)

These two new ultra-slim transceivers have got to be the smallest transceivers around, both are designed to give maximum portability and convenience. Even including battery pack these radios will fit into your shirt/jeans pocket or handbag. Features include: 10 memory channels, scanning, power-save function and dual tuning steps. A full range of practical accessories are available to make your ICOM handheld even more versatile! Features include: 10 memory channels to store repeater info, frequency and memory scanning, power-save function, 24 hour clock and much more.

Available

All ICOM equipment purchased in some cases the equipment will need and satisfactory repair. Any authorized dealer is not covered by Greenhill, Chris G8GKC at Herne Bay wish you a Happy Christmas and

Birmingham, Chris G8GKC at Herne Bay wish you a Happy Christmas and
Satellite Scene

by Pat Gowen G3IOR

Contributions from several developing new amateur radio satellite groups reveal that we have many new satellites coming in the future. A few of these are described this month by Pat Gowen G3IOR. Pat also has a few tips for your Christmas stocking.

New Russian Launch

The next Russian amateur radio satellite launch is planned for early 1993. The launch will place RS-15 into a near circular polar orbit, with a 2300km altitude at 67° inclination. The satellite will thus give excellent intercontinental QSO coverage, with all of North America, South Africa, Asia, the Caribbean and much of South and Central America being in mutual range of Europe. This 70kg package has been built by a team under the auspices of chief constructor V.N. Arbuzov at the NPO of Applied Mechanics in Krasnoyarsk.

The RS-15 satellite carries a further technical development of the now famous BRTK transponder complex series as flown in the earlier RS satellites. The latest model has been designed by the Laboratory of Space Technology of the Tsaidovski Museum of Cosmonautics, club station RS3X in Kaluga C.I.S.

The satellite was designed within a group headed by Alexander Papkov UA3XWW and Victor Samkov. Alex, the chief architect, can be seen in Fig. 1 demonstrating the BRTK-10 assembly, while Victor can be seen building it in Fig. 2.

The Equipment

The RS-15’s assembly of equipment consists of a Mode A linear transponder and two beacons, one at each end of the 40kHz linear non-inverting downlink passband, a bulletin board with 2mb of memory, a command complex, and a 64-channel metered parameter telemetry system. The frequencies to be used for RS-15 are as follows:

- Uplink passband: 145.857MHz to 145.897MHz
- Downlink passband: 29.357MHz to 29.397MHz
  - Beacon 1: 29.386MHz
  - Beacon 2: 29.353MHz

Output Power

The transponder downlink transmitter will produce 5W of radio frequency output power, while the beacons will run either 0.4W or 1.2W according to command instruction. The transponder will have quarter-wave monopole antennas for both uplink and downlink.

The Laboratory of Aero-Cosmical Technology belonging to the Russian Defence and the ‘ROSTO’ Technical Sports Organisation, have both assisted in the RS satellite launch and operation. As has the space laboratory headed by V.S. Yaminov and the RS control station RS3A, from whence Andy Mirinov RK3KPK sent the photographs for us to see. Public relations are conducted by Dr. Alexander Zaitzev RW3DZ.

Any readers interested in experimental work with RS-15 are invited to contact V. Yaminov at the Laboratory of Aero-Cosmic Technology, ROSTO, ul. Zemlynoi Wal 46/48; MOSCOW 103 064, RUSSIA, or via e-mail to rw3dz@rw3dz.public.sa for A. Zaitzev.

University Of Mexico Satellite

The primary mission of UNAMSAT is to act as a meteor sounder. It will contain a specially converted ITU licensed 40.097MHz transmitter with 60W of pulsed r.f. output. This can be varied between one and 10 milliseconds in duration with a pulse repetition rate of between one and 10 seconds, all controlled by a 68HC05 c.p.u.

The resulting meteor echoes will be detected on a receiver operating on the same frequency. It will be measuring both their amplitude and Doppler shift, in order to obtain research data on the full-sky spatial and velocity distribution of meteors. The main focus of the experiment is to search for high-velocity meteors.

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originating from outside our solar system.

The transmitter is frequency controlled, and has a class 'E' power amplifier. The meteor receiver is an s.s.b. 'Zero-IF' design, recommended by Tom Clark W3IWI. The returned echoes will be digitised and stored in the normal V-40 MICROSMAT computer's RAM. After each pulse, the spectrum of the received signal will be determined using the onboard V40 as a DSP Fourier transform spectrum analyser. When a meteor echo is detected, the echo will be saved for later transmission as a special telemetry frame.

The 1-10 second repetition rate for the meteor transmitter will be adjusted depending on the state of charge of the batteries, and other spacecraft power requirements. It will also be dependent on the time domain requirements of the echoes.

**Standard Downlink**

The data downlink will be sent using standard amateur AX.25 packet specifications. When UNAMSAT-1 is not involved in meteor research, it will run as a standard PACSAT message store-and-forward satellite, just like the other microsats series AO-16, DO-17, FO-18 and LO-19.

As with the earlier MICROSMATS, it will have five modules, each about 20cm on a side. Four of the five modules are updated clones of existing MICROSMAT hardware/software.

**The Design Team**

The dual 435MHz p.s.k. transmitters have been designed by YT3MV, the V40 c.p.u. by WA7GXD, and the others from TAPR, the Tucson Amateur Packet Radio group, with modifications by I2KBĐ and ITAMSAT. The power system and the 'BCR' Battery Charger Regulator is by KE3Z and the ARRL. The 5-channel 145MHz FSK receiver is by W3IWI, and the software, similar to that of the other microsats, is from NK6K and GO/K8KA. The AART bus architecture is by W3IWI and N5BREG.

The V40 c.p.u. will have 4mb of bulk RAM vs 8mb. Power for UNAMSAT-1 will be provided by the latest high efficiency Gallium Arsenide solar panels of BSRF technology, as earlier flown on the MICROSMAT series.

An innovative new addition is the brand-new on-board experiment in the 5th 'TSFR' ('This Space For Rent') module. The final 145MHz uplink and the 435MHz downlink have yet to be IFRB and AMSAT agreed.

Walt Dave XE/TU has been responsible for technical development of UNAMSAT-1, the scientific direction for the project has been provided by UNAM Professor of Astronomy, Arcadio Poveda. AMSAT-NA provided the technical details of the MICROSMAT satellites. Technical assistance from AMSAT-NA has been provided by W3GEY, N4HY, NK6K, W3IWI and WD04FAB. Aid from ITAMSAT was co-ordinated through I2KBĐ.

**Political Problems**

As a few international political problems arose with the earlier planned ESA launch of UNAMSAT-1 by ARIANE, it is now planned to be placed into 100km high orbit with a large meteorological satellite. This is to be launched by the Russian Space Agency and the Russian Academy of Sciences, using a decommissioned SS-18 ICBM. At the time of writing, the launch is scheduled for the first week of December 1992, so it may well be operational by the time you read these details.

**Christmas Stocking**

As you probably have enough handkerchiefs, socks and ties to last a lifetime, you may well need to suggest to your nearest and dearest, for the Christmas present. What could be better than some bedtime reading on satellites?

**Information Books**

The RSGB Space Radio Handbook written by John Brangan GM4IUJ is available from the RSGB, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE. It is filled with information, descriptive tables and drawings on satellites and general space information, with some excellent 'DIY' experiments included.

The Mir Manual also written by GM4IUJ, is specific to the MIR space station, and is packed with data, diagrams and experimental content. This is available from 8 Whitehills, Saline, Fife. Scotland KY12 9JJ. The U-5 Manual comes from the same source, and may be used as a valuable resource for either UoSAT-OSCAR-22 or the new KITSAT-OSCAR-24. These three manuals will be reprinted if demand requires them.

The Satellite Experimenters Handbook by Mark Daviddoff K2UBC, is a regular bible and is a must for the satellite enthusiast, be it beginner or expert. It contains virtually all you need to know on every aspect, from antennas to Z- axis, and comes from the AMSAT Headquarters at 850 Sligo Avenue, Suite 600, Silver Spring, MD 20910-4703, USA. (Telephone USA 301-589-6062, FAX 301-608-3410. Decoding Telemetry from the Amateur Satellites by G. Smith is also available from AMSAT, as is Weather Satellites by R. Taggart.

**Fundamentals**

Astronomical Formulae for Calculators by J. Meas, is published by Willmann-Bell, P.O. Box 35025, Richmond, VA 23235, USA, and from the same source comes Methods Orbit Determination for the Microcomputer by Boulet. Fundamentals of Astrodynamics by Bate is available from Dover Publications USA. Orbital Motion by A. E. Roy is from Adam Hilger UK, and the Cambridge Encyclopedia of Space by Martin Rycroft is from Cambridge University Press, UK.

**Magazines**

For regular magazines, first and foremost consider a regular subscription to Practical Wireless. If you have this already, think about taking Aviation and Space Week and/or Flight International both of which are available from near you. SpaceFlight comes from BIS, 27 South Lambeth Road, London SW8 1SZ.

Oscar Satellite Report is published and available from R. Myers Communications, PO Box 17108, Fountain Hills, AZ 85269-7108, USA, and Satellite Operator is from the same source. The Journal of Environmental Satellite Amateur User Group hails from the Dallas Remote Imaging Group, PO Box 117088, Carrolton, TX, USA.

If you can read German, the AMSAT DL Journal from AMSAT DL, Holderstrach 10, 3350 Marburg 1, Germany, is the excellently produced magazine of AMSAT-DL. OSCAR News is the newsletter of AMSAT-UK, and comes with membership of the organisation, details from G3AAJ QTHR. The AMSAT Journal, which incorporates the 'AMSAT Newsletter', is the magazine of AMSAT North America, from AMSAT-NA Headquarters at the address given earlier. Happy reading and Happy Christmas everybody!
Mathematics For The RAE

Before we hand over to Ray, I must apologise for two mistakes that crept last month's column. It was impossible to choose the correct answers to questions i and iii, because there weren't any! The mistakes were ours, and not the author's. The answer to question i) was 1.592kΩ, and the answer to question iii) was 37.9pF. Please accept my apologies for these errors. Editor.

Here are the answers for those questions that had correct answers printed:

ii) a
iv) d

I'm sure you got them all right, in spite of the errors.

This month, I intend to look at resonance, and I shall start with the series resonant case. Look at the circuit diagram Fig. 1. Here you can see that all the elements of the circuit are in series. From previous issues we know that the reactance of a capacitor falls with frequency, but the reactance of an inductor rises with frequency. In this circuit terminals A and B are the external connections.

Equal But Opposite

At just one frequency the reactances must be the same numerically. At this frequency the (positive) reactance of the inductor is equal, but opposite to, the (negative) reactance of the capacitor. The important fact is that the reactances are equal but opposite.

In any circuit containing both reactance and resistance, the effective opposition to the flow of alternating current (a.c.) is called impedance. For the purposes of this series we will only deal with the easiest of cases, those involving resonant circuits, i.e. when both inductive and capacitive reactances are numerically equal.

At Resonance Only

When we dealt with series circuits, the total opposition to flow of current, was simply the sum of all the individual opposing values added together. When we dealt with resistors, we simply added all the resistance values together to arrive at an answer. At resonance, and at resonance only, we simply add the reactances and resistances together.

At any frequency other than the resonant frequency (or at least very close to it), the total impedance is fairly complicated to evaluate, but fortunately, this type of calculation is not necessary for the RAE. We only need to be able to calculate the impedance of a series resonant circuit, such as Fig. 1, at resonance, and know at what frequency the circuit is said to be resonant.

Series Resonant

In the series resonant case, the impedance is actually the easiest to calculate. But let's put some figures into the problem. In Fig. 1, let's assume that L=0.1H, C=0.253μF and that R=300Ω.

As we've discovered, the reactance of either an inductor, or a capacitor, depends on the frequency of the a.c. flowing through the component. One important thing to remember, is that the resistance value of a 'pure' resistor doesn't vary with frequency. So we can assume that the resistance of R is 300Ω at d.c. or at 1MHz, or even at 10GHz (10000MHz).

So, back to our problem. What is the impedance of the circuit at a frequency of 1kHz (1000Hz)? I've cheated a little and arranged it so that 1kHz is the series resonant frequency.

From previous sessions, we know that for the reactance (X_L) of an inductor, X_L =2πfL. Again I'm assuming a value of 3.141 for π, as I've done in previous months.

Therefore X_L =+(2πx1000x0.1)=+628.2Ω
We also know that for the reactance (X_C) of a capacitor, X_C =1/(2πfC)

Therefore X_C =-(1/(2πx1000x0.253x10^-6))=-629.2Ω.

I know the two terms are not numerically identical, but with an error of 1 in 629 is almost insignificant. In fact, I'm going to ignore this very small error and say that, numerically, the inductive reactance is equal, but opposite to, the capacitive reactance.

So, at resonance only, the inductive and the capacitive reactances cancel out, leaving only the resistive part. This means that the impedance of the circuit is just the 300Ω value of the resistor R. See Fig. 2 for the overall impedance curve.

For the series resonant case there's an important rule to remember:

At resonance, the only opposition to the flow of alternating current in a series circuit, is that of the resistance.

Resonant Frequency

Finding the impedance was easy to do, but one small problem remains. How do we find out at what frequency the circuit is said to be resonant?

From above, you will see that the resonant frequency (I'll call it f_r to make it easier), is said to be: the frequency at which the inductive reactance is numerically the same as the capacitive reactance.

The resonant frequency f_r is where X_L =X_C

2πf_r =1/(2πf_rC)

I won't bother you with the maths involved in resolving the two equations above. But it is important that you remember the final line of this solution, which is:

\[ f_r = \frac{1}{2 \sqrt{LC}} \]

Sometimes words make these things easier to remember, and the words for this are:

The resonance frequency is: 'one over two pi root El-Cee'.

This should make it easier to recall when you come to use it.

Space doesn't allow me to give you any questions this month, but you could use the example above, to verify the equation for the resonant frequency. In the example above, I said the circuit, consisting of L=0.1H and C=0.253μF, was resonant at 1kHz. Try putting these values into the formula and calculate f_r for the circuit.

That's it for this month. See you next time.

This month, Ray Fautley G3ASG discusses tuned circuits and resonance.
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I seem, over the past couple of months, to have had a problem with the 'KF6 filing system. If anyone has had their report omitted of late, please accept my apologies and I promise to see it doesn't happen again.

Very much of a 'curate's egg' sort of month to report upon this time. There have been some days that were very good, but more that were mediocre. However, that's part of the fun of the thing! No doubt, while we are sliding more quickly now toward the bottom of the sunspot cycle.

The **WARC Bands**

Let's make a start with the WARC bands, and Don GN0F in Yeovil. Don as usual stuck to sideband, and netted on 18MHz A4Z2Z, CN1A, EU10, EV1S, CY0NSM (Sable Is), FR5DX, H44/JA10EM, K0X0E, HB0/DL6MBX, IZV, J4S, KF0TB (North Dakota), N7ZJH, O1HAFGJ, SX1Q, N3GM, P0DLD, F51BMJ, F7F, T7TJ, T77, AUFF, on Zone 18 B, UZ4AA, V51JM, V55BP, VECVM, VE1NU, VP5JM, V8PRDOT (Rothera Base, Antarctica), W2, XJUUN, ZA/DH1XT, ZL2DX, ZL2PW, ZL4DJ, ZS6YA, 5Q2ES, SA/DL3JH and 9Y1NV. Turning to 24MHz, Don notes C07JC, EU10, FR5DX, HX5LEX, H2T1AB, JA1DQV, 2A2G, HB0/COS (Jul), KB7DNC (Neveda), KPJ2, DX3KM, PY2F, PZ1EL, R0A0A, RYU0, SW8L3CRP, MM7MD, VEL, VK5AZL, VP5MEM, VP9MN, W8KT, W5FYPTQ2, ZA/DH1MTK, ZS9D0 and 9K2MU.

Ted GZHU on the Isle of Sheppey has been 'in the wars' again which has rather restricted his activity this time, but on 10MHz he did manage to key with 4L1A, ZA1J, ZA1F, U8MBA and FYSFX.

Next we head for Malta, where Vince S9H1P in Mfj Scale used 2MHz for ZD8Z and ZB2JL, while a change down to 18MHz yielded PK4CXY, FR5DX, ZB2JJ, VP5JM and HB0/DL1MFS.

**Amusing Letter**

A most amusing letter from John Weston-Smith who apologises for his brief absence - his last report was in July. In those far-off days John used an old ex-WWII PC3, but now, as a free-lance writer on aviation subjects, he has recently bought a Yaesu 7700 to receive VOlume.

Naturally, John tuned to the amateur bands, found some DX - and seems to have become hooked again! However, he would like to know if anyone out there might conceivably still have a PC3R which they would be prepared to part with, for the sake of nostalgia!

I have to admit that the last time I saw one 'used in anger' was around 1946, and I haven't set eyes on one since! Offers or suggestions please, direct to John Weston-Smith, Burgraed House, Chart Road, Sutton Valence, Kent ME17 3AW.

**DXAC Recommendations**

The DXAC recommendations are as follows: YU7, YU8 and YU9 retain the 'old' Yugoslavian DXCC country. But SA Croatia and SS Slovenia add to the list effective June 26 last, YU4 Bosnia-Herzegovina effective October 15 last, and Macedonia YU5 from September 8.

However, these must 'go through the sausage-machine' before they are finally accepted, so don't submit GSL cards until advised.

Still with DXCC, I understand 5R6BW operations beginning 12 December 1991 are acceptable and cards may be submitted, or if rejected, on the other hand, OH0AY and TF5TP are said to be Slim again.

**TOPS Activity Contest**

The TOPS Activity Contest on 1.8MHz comes up again on the first weekend in December, 1800UTC to 0600UTC. As for Kevin GW5PUH in Pontypool, he has a converted a.m. CB set to a 2-element tribander at around 12m (45') at the bottom of the valley. Using either eight or 1W of a.m., contacts were made with WA3EUL and N8HYR. In both cases the QSOs were maintained at Q5 level.

Even Don GN0F could find the going a bit sticky on this band, with ZD8LI, SU7M and 7DXX as the total. Shawn lives in the Nechells area of Birmingham and he records 59901/883. QSO with own country (or call area if appropriate) count one, own continent two, other continent six, with /MM stations six, with a TOPS member two bonus points, between TOPS members three bonus points. QSO with GB6AO, 10 bonus points.

The multiplier is the number of prefixes worked, all same WPX listings. Final score, total QSO and bonus points times multiplier. Classes Single-op, multi-op, and QRP single-op. Log deadline January 31, to Helmut Klein DE8TKW, Nauseagasse 24/26, A-1160 Wien, Austria. Details of the TOPS CW club, from G3AVR at 48 Hadrian Road, Newcastle-upon-Tyne NE4 90H.

**The 28MHz Band**

On the 28MHz band, there has been the odd opening to record; for example Ted GZHU's keyer connected to CSRJL.

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**The 3.5MHz Band**

The antenna problems outlined above didn't help me on the 3.5MHz band either, alas, but I did manage to enjoy the Sunday morning natter-sessions in (comparative) peace.

Short wave listener Andrew Fryer in London's SW16 started September well by acquiring a Lowe 225, and hanging up some 30m of wire around the inside of his bedroom. This is connected direct into the receiver (no tuner), and on 3.5MHz he mentions regular mornings with ZL4KF, ZL2JR, ZL1CCR, plus V01FG, CN68I, TI4CF all on sideband, plus RV3OCM on the key.

However, during the hours of darkness, reception is marred on this band by an 84 buzz-saw noise, and Andrew wonders what he is up against. My first thought is to wonder if the noise might go away when the TV is switched off. However, the offender may well be in a different house!

**Rare And Special Prefixes**

As for Kevin GW5PUH in Pontypool, he has a converted a.m. CB set to a 2-element tribander at around 12m (45') at the bottom of the valley. Using either eight or 1W of a.m., contacts were made with WA3EUL and N8HYR. In both cases the QSOs were maintained at Q5 level.

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**The 7MHz Band**

On the 7MHz band, first there is Eric G6KRT. Eric is in Worcestershire Park, Surrey, and uses a Lake DTR7 at about 1W output, fed to a WA3EP antenna modified by the use of a full quarter-wave counterpoise. Eric had two-way QRP contacts on the key with G0PSK, G0DDQ and PA4N; other contacts included DL5, DL8, EA2BUIR, FE1DEI, HB8AEP, HX2SHV, IASMT, DE69ARD, RA4CQ, RB5GDD, SLO2G, SM6DDI, SM4PQO, SM4GEL, ON4GJ, Y2JJLX, YT3KD and YU3DDO. As a side-exercise, steady
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OUR AIM IS 100% SATISFACTION!
The 14/21MHz Bands

The 14 and 21MHz bands, which are, as ever, where the real business is mostly done. Don GN3OF notes his 14MHz sideband gleanings as being

\[ 142VE, A5PSH, C8RDM, E2PHZ, F8SAIG, F5YSF, F3YSE, H2ITA, G9K7MVE (Lampedusa), J2BGJ, J1MVWVB, J1TBW, J206V, JY5H, K7KLJ, DX2KM, RHAY8V, S21A, SV8DIS3CR, T276NU, TB8NG, VK3AAJ/5 (IOTA 0C-139), VP8CFM (S Dinkey), VP8CBS (S Georgia), V867N, X95AS, 47ATVR, 5H3DJC, 7QLV8, TX28G, SM2H8, 9M18FH. On the 21MHz front, we find U3J3NFH, D2EL/P, DXUKRM, H21AB, K0FBI (S Dakota), P69WK, RA0FA (Zone 19), RE2OCT, RO200T, S21ZD, ULG7Y, US0B, UV1AD (IOTA EU-133), V83DJ, V83JIC, VK3AKX, VK3APE, VP9CLO, VS500, assorted Ws including W7LF in Montana and 8A2P for a YB in disguise.

Auroral Activity

As I’ve already mentioned, there was a fairly amount of auroral activity during October with openings being recorded in central England on October 9, 10, 11, 12, 13, 27, 28 and 29. An auroral opening was reported on October 28, but no auroral activity was seen on October 14, although nothing seemed to have come of it. During the period from October 19 to the end of the month the geomagnetic field was very disturbed, although it did calm down considerably on October 24, with the A index dipping to a level of only one unit. However, by the end of the month the activity was high again, reaching levels of 26 units on October 29 and 30, and further auroral openings were reported on October 27, 28 and 29. At 1816UTC on October 30, there was a major flare and on October 31 a warning was issued of a proton event and the geomagnetic field was at major storm level.

The solar flux levels were quite low during the month, sinking to only 98 units on October 16 but rising to peak at 229 on October 31.

Forecasting 50MHz

My crystal ball is distinctly murky when it comes to forecasting what might happen on the 50MHz band this winter. I suspect that very little in the way of DX will be found, but when it does it will be on the day that you want shopping!

The operators that catch the openings are those who regularly check the bands and keep up-to-date (possibly via the DX clusters) with what’s going on in the way of propagation. Don’t forget to keep a look out also for the winter peak in Sporadic-E. It might even reach 144MHz! Auroral activity will probably continue, so keep those 27-day calendars up-to-date and check the v.h.f. bands every day at the appropriate times.

October Tropo

Conditions during most of October were nothing to write home about (unfortunately for a v.h.f. columnist!). However, the tropospheric opening on October 7-8 was rather excellent and allowed many contacts to be made on the v.h.f. and u.h.f. bands, with stations up to 1700km away.

John Regnault

G4SXW (J002) seemed to be ideally located on the east coast, as much of the DX only seemed to penetrate about 150km further west. Between 1725-2244UTC, he worked 65 x 5P on the 144MHz band, including SP7BCA, SP7D0G, SP7JSG, SP7GGR, SP7RUV and SP7SQD in locator KO01, SP5EFO, SP5ENM, SP5NHF and SP7A2P in K002.
grade during the opening on October 8 by working DH3KR (JO30), DL6VC/P (JO73), DL7UME (JO62), DL7UTS (JO62), 0260L (JO65), SL7DL (JO66) and his first ARRL stations SP1KV (JO73) and SP5EFO.

It seemed to me that my QTH (I0B1MX) was too far west to enjoy the opening on October 8, and although I worked a few stations at some very good distances it was obvious that the QTH was suiting other locations. Contacts made on the 14MHz band between 1900-2000UTC inclusive of LU6G (JO50), DL9NDS/A, Y22ET (JO51), DK1VEI at 1300km, SP6GBW/P (JO80) at 1400km and for the best DX of the evening SP5EFO at 1840km.

Neil Underwood G4LDR (I0B1) worked 02Z5S on the 14MHz band and SM7TEC, for a new country on the 430MHz band, during the evening of October 7 and DK1VEI on both bands the following day. Neil also heard SP from locator K002 on the 430MHz band but could not get through the pile-up!

Meteor Showers

The following data concerning meteor showers during December-January will help you determine which is the best direction to beam at specific times and when the shower is below the horizon.

The Geminids shower lasts from December 13-14 and had its anticipated maximum activity occurring on Sunday 13th. Between 2000 to 2200UTC beam north or south, 2200 to 0100UTC beam north-east or south-west, 0100 to 0400UTC beam east or west, 0300 to 0500UTC beam south-east or north-west. The shower radiant is low between 0900 to 1900UTC.

The Ursids shower will occur between December 16-24, peaking on Tuesday 22nd. It is not particularly good in the north-south direction but to compensate for this all paths from north-east through east to south-east are quite good, and are available at all times of the day.

The Quadrantids meteor shower will be encountered between January 2-6, peaking sharply on Monday 4th. Between 0100-0400UTC beam south-east or north-west, 0400 to 0900UTC beam north or south, 0700 to 1000UTC beam east or west, 1200 to 1700UTC beam north-east or south-west. The shower radiant is love between the hours of 1500-0000UTC and there is not very usable for meteor scatter. I have always found this shower to be particularly good to Scandinavia in mid-afternoon.

Moonbounce

Now to moonbounce. Conditions for the first leg of the ARRL e.m.e. contest on October 17-18 didn’t look all that promising. The geomagnetic field being at minor storm level on the 15th and 18th and the geomagnetic A index reaching 25 units.

Under these type of conditions e.m.e. signals become even more weak and watery, echoes are hard to come by and problems can occur with faraday rotation. Although the geomagnetic activity had reduced to unsettled levels by the 17th, conditions were far from ideal.

At the station of OZ5ZS a 440MHz e.m.e. operation started on October 17 at the unearthly hour of 0445UTC and contacts were made on the 144MHz band. DL3BW (ex-Y22ME), G6LBK, LA9RJ, LZ1YK, OESFL, 024MM, SM5FRH (using a QBL5/2500 and 24 x 18-element KLM Yagis), SM7BIA, A4AFQ, WS4WTC, K5SW (very loud and reputed to be a 44-Yagi station), WS5U, K6HXX, WA5MGZ (1.5kW and 8 x M2 Yagis), WA6PEV, K7CA, N8AM, AF9Y and finally at noonset, around 1210UTC, K8BSI.

Signals at moonrise, from 2045UTC, were surprisingly strong but after 15 minutes or so they had deteriorated such that only the big stations were audible. In this session, up to 2230UTC, John worked DK1KO, DL8DAT, I2FAK, IK3MAC, DK1MS (1kW and 8 x 15-element Yagis), RA6HHT, SM5MIX (1kW and 4 x 18-element Cushcraft Yagis) and UZ2FWA (1.5kW and 8 x DJBSY Yagis).

Conditions on Sunday October 18 showed no improvement from that of the previous day but nevertheless contacts were made between 0535-1140UTC with DL5MAE, FJ7TA, PJ6RI (4 x DJBSY Yagis), G0GMS (only two Yagis), OH5Y, DJ9H, K50UK (1kW and four Yagis), VE4BH, WR1, and W0HP. John mentions that since getting into 144MHz e.m.e. two years ago he has made over 600 contacts and four Yagis), VV7VXW (1kW and 8 x 15-element Cushcraft Yagis) and UZ2FWA (1.5kW and 8 x DJBSY Yagis).

Fig. 2: 50MHz and 28MHz antenna system at the QTH of Q7EYJ.

I haven’t reported about activity on the 50MHz band since the September issue of PW, so it’s about time I brought you up-to-date with what’s been going on since the end of June.

A total of 82 permits were issued during June to Spanish amateurs, including the DXCC countries of EA6, EA9 and EA8. All permit holders must use the prefix EH in place of the normal EA, for example EA8VQ becomes EH8VQ when operating on the 50MHz band. The ‘rare’ callsigns to look out for are EH8ET, EH8EF, EH8IF, EH8HA, EH8QV, EH8ACW, EH8IB and EH8MH.

During June, July and August, 13 Polish special event stations were granted permission to operate on the 50MHz band to find out if any interference would be caused to other services. They were HFP3AR (SP5PCV), HFP3PA (SP7VH), SN3SP8 (SP5CC), SN4YP (SP7TIB), S05SPAR (SP5HEJ), SR3PAR (SP3TY), SR5SPAR (SP5TAW), SR5SPAR (SP9DUX), 3Z2PAR (SP3UC), 3Z5PAR (SP4KK), 3Z5PAR (SP5SFEO), 3Z7PAR (SP7VMB) and 3Z9PAR (SP9EHS).

All QSLs go via the operator in brackets. The experiment was a success and it is expected that most Polish amateurs would be given 50MHz permits, commencing from November and using the more familiar SP prefix.

Conditions during July and August were predominantly effected by Sp-E propagation. This allowed almost daily contacts to be made with stations up to 2000km away.

Some of the more interesting DX during this period included LY2VR (TV Transmitters RC, Box 927, 2044 Vilnius, Lithuania), LZ1HC (Slavi Lysutskanov, Box 74, 6000 Staro Zagora, Bulgaria), Y6YA (QSL via O6JOU), 1A0Z1000 (Uffe Lindhard, Osterspgade 49 2 200, Copenhagen S, Denmark), TASA 10SL (via Antoine Baudisch, F6N2J, BP 14, F-91291 Arpajon Cedex, France), TSS11 (a special Sardinian callsign celebrating the launch of the first Italian astronaut on board the shuttle Atlantis (QSL via I0WVWA), UA2E/DKZ2E (Rolf Niefend, Rademaker Kamp 2, W-2117 Kachenstorf, Germany), UIX4 (QSL via W. Leino) OH2BC, see UX1A), 4X1IF (Ralph Cochran, Charlotte, MI48813, USA).

It may be worth noting that K8EFS is also the QSL manager for CN8ST, V51E, ZS5E, DL32M/YVS and YV2EZ.

Apart from the DX already mentioned, a few brief openings into Africa were also recorded with 3SW6V, 7Q7JL and 7Q7RM appearing on the band during July August, generally between 1600-1700UTC.

Band conditions during September noticeably changed as the geomagnetic field became more active, the effects of Sp-E propagation lessened and auroras became more prevalent. Very little African DX was heard, but a new station, 3X0HNU in Guinea, put in a few appearances.

It looked as if there was going to be an upturn in conditions in October when the band opened up to South America on three consecutive evenings between October 4-6, allowing a few UK stations to work PY3CC and ZP5JCY. However, the band quickly settled back to its semi-dormant state and apart from one or two openings to Africa, not very much in the way of real DX was worked. Openings via Sp-E were observed on a few days throughout the month, allowing contacts to be made with EH, I and YU.

On October 11, it was interesting to note that if you beamed south you could work into southern Europe, Sp-E and into Africa via t.e.p. to work A22ZB, 7Q7JL and 7QLFA, if you beamed north you could work GMs via aurora. All modes were occurring at the same time, between 1700-1900UTC.

A new beacon, TUVZHF, is now operational from the Ivory Coast in locator U7BND. Operating on
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50.094MHz, it has already been heard in the UK during October.

Darren Collins G7EY (1090) runs an FT102, RN Electronics transverter, a mast-head pre-amplifier and a home made 5-element NBS Yagi, as the photograph Fig. 2 shows. Some of his s.s.b. contacts made during the summer have included FR4JOJS on Gloseo Island (but unfortunately without a permit), TA2GA, VS1SW, ZS6AXT, ZS4PAR, SB4/GO3KD, DX7UL and 7D7KM. During the UK Six Metre Group contest on June 6, Darren worked CT, CF, DL, ES, G, GD, GJ, GM, GV, I, IS0, LA, LE, DH, DHO, DK, DN, GZ, PA, SM, SV, TA, YO, ZB, Z2 and SH, a grand total of 27 countries in one day! Can anyone else beat this?

At the station of G1KTX (Poole, Dorset), Dave has been using a 9-element F9FT Yagi in use does not appear to be working properly. Yagi in use does not appear to be working properly. I know which antenna Collin has put on the pole and a number of contacts have already been made. Contacts on the 70MHz band have been tried using the 50MHz Yagi, the best DX so far being GW4BYV/P. Originally the 3-element MET antenna was cut down to a 2-element and mounted on a 2.5m pole, clamped to a Black and Decker Workmate in the back garden. Despite these limitations, John managed to work DG8BR (LN18) on the 50MHz band with it earlier this year. It all goes to show that it is possible to work DX even with a lash-up, and that some sort of antenna is always better than no antenna!

New DXCC Countries

The ARRL DX Advisory Committee (DXAC) has voted to recommend the following new additions to the DXCC countries list. The Republic of Croatia - 9A (was YU), the Republic of Slovenia - SS (was YU3), the Republic of Bosnia and Herzegovina - YU4 and the Republic of Macedonia - YU5.

The ARRL recommends to the ARRL Awards Committee for consideration in January 1993. The start dates will be announced later if the DXAC recommendation is adopted. Therefore do not send QSL cards to the DXCC desk for these countries until they have been officially added to the list, and a date for acceptance has been announced.

Weinheim Convention

Following my report about the Weinheim convention in last months PW, I have received further details from Volker DFI7. Volker reports that at the barbeque, held at the DLOHW club headquarters on the Friday evening, comprising of Serbia - YU1, Montenegro - YU6, Vojvodina - YU7 and Kosovo - YU8 to continue on DXCC countries list. The Republic of Croatia - 9A (was YU), the Republic of Slovenia - SS (was YU3), the Republic of Bosnia and Herzegovina - YU4 and the Republic of Macedonia - YU5.

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**Accessories**

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**VHF/UHF MOBILES**

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**ICOM**

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**Kenwood**

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**HANDBEHDS**

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Practical Wireless, January 1993
The most startling piece of news from the world of international radio comes this month from Luxembourg, which announced its intention to close Radio Luxembourg, the English service from the Grand Duchy, at the end of December 1992. The station stopped using the familiar medium wave channel of 1.440MHz some months ago, concentrating entirely on the Astra satellite service, as well as a short wave relay. But now the English service will come off the air entirely as it appears not to be paying its way. The final transmission will be on December 30 on Astra transponder facilities at Yamata near Tokyo are to be expanded. Three new 300kW transmitters will be in operation from March 1993, together with a similar number of antennas. The new equipment is designed to improve reception in China and South East Asia. It may be that the BBC World Service will be hiring time on the Japanese facilities, following the success of the agreement which has enabled NHK to operate from the BBC's Skelton site in Cumbria. Watch this column for more details.

This month's post bag to the 'Broadcast Round-up' column is more extensive than usual, with letters from more distant places than recently. I was delighted to hear from Asantha Cooray in Colombo, Sri Lanka, who sent me an extensive loggings list from his QTH, although Asantha doesn't tell us what his receiver is. A selection of his more interesting catches appear later in the column.

From closer to home, regular correspondent Roy Merrill has sent lots of news from his base in Luton. Thanks to you both, and don't forget that I would like to hear from more readers with any news, frequencies, tips or suggestions. Please send them in to the PW Office in Poole.

European Stations

All times GMT (UTC)

Radio Tirana's winter schedule for England now is:

1530-1600 on 9.76 and 7.155
2200-2230 on 11.825, 9.76 and 1.395MHz
0300-0300 on 11.84 and 9.58
0230-0300 on 11.84 and 9.585MHz.

Roy Merrill starts his contribution this month with an unusual RFC frequency. He's come across English to West Africa from Ascension on 11.86MHz at 0800 for 15 minutes on a beam of 27°.

Two stations noted from Italy: the Voice of Europe is a low-power pop station noted often at around 1030 on 13.60MHz (variable), paired up for 24-hour operation but generally fading badly after 1100. European Christian Radio is sometimes heard fairly clearly under a weak but usually audible signal. The full frequency is 6.21MHz from around 1045. Heard daily by Roy since mid-September on 15.415MHz from sign-on at 1556 is a Russian language station identified as "Govor, Golv Israelski Arabaska (Ne)Rodina" or similar. He believes this transmits roughly as the Voice of Israeli Arab Peace. Curiously, the first two days of observation on September 14 and 15, there followed a German language transmission up to 1700 sign-off, but from then on the programme has been segmented in to what seems to be a variety of eastern European and Russian languages. Signals peak at SIO544 most days.

For those of you lucky enough to have access to satellite facilities, there is a new Swiss music station on Astra, on the same transponder as Swiss Radio International (number B). It's quite a curious station, broadcasting a mixture of Swiss folk music and country and western music! Called Radio E Viva! It operates out of Zurich and can be found in stereo on audio sub carriers at 7.74 and 7.92MHz.

Radio Ukraine International is now heard at 2200 on 5.96, 7.24, 7.25, 9.60, 9.665, 9.785 and 9.82MHz.

Africa and Middle Eastern Stations

There is more evidence of the hire of Russian transmitters to clandestine stations. The Voice of Ethiopian Patriotism has been noted on 21.785 and 17.57MHz on Sunday and Wednesday at 1950GMT for 30 minutes. Contact addresses for the station are in Sweden and the United States: Voice of Ethiopian Patriotism, PO Box 5077, S-163 05 Spanga, Stockholm, Sweden and Coalition of Ethiopian Democratic Forces, PO Box 21307, Washington DC 20009, USA.

The Voice of the Broad Masses of Ethiopia on 7.38MHz is clearly quite audible after 1600 despite Radio Ala later on the same channel. Noted in Afar with SIO242, with change to Amharic at 1630. The interval signal is an electronic keyboard sequence similar to the Voice of Ethiopia. Closing announcement and sign-off is on a clear channel at 1700.

Radio Cairo has been observed with woolly modulation in Italian at 1850 on 9.995MHz, followed by Arabic with strong signals.

The Voice of the Iraqi People has added another channel, which has been strongly heard on 15.56MHz in parallel with 17.955MHz at around 1620. The parallel 15.60MHz frequency seems to be jammed, but remains audible. The full frequency is 6.15MHz from around 1830 to 2111 with SIO peak at 443, although there is often heavy QSB and ORN.

The RTV Malienne service in Banjul has been surprisingly strong and regularly heard on 9.635MHz from around 0800 sign-on and improves steadily to a peak of SIO34 at times around 0950. There is a slow fade-out to 1000 at the station's normal sign-off.

Radio Oman still provides an occasionally strong signal on 11.89MHz at around 2000. Many references to "Masquush" and "Uman". A phone-in programme was recently observed with recorded music between calls. Westminster-style chimes were heard at 2100. The parallel frequency of 9.735MHz is usually buried in a very recorded channel.

Qatar Broadcasting Service is now heard on 11.820MHz from around 1730 up to a clear identification on the hour at 1800 and 1900, after which it descends into the clutter.

Roy Merrill is disappointed, as after a fantastic two or three days of National Unity Radio on 9.19MHz, nothing has been heard since September 10, when the English at 1550 was very good. The service was heard the following morning, also on 9.19 at around 0950, but no more Radio Omdurman or National Unity Radio. Was it something he wrote for 'Broadcast Round-up', Roy asks!

Radio Tanzania now has an English overseas service on 5.05MHz at 0300-0430 and 0900-1030 and on weekdays only 1530-1915. During weekends, the station is continuous from 0900-1515. Reception is spoilt by a persistent agile clandestine and its attendant jammer right through to final close-down at 2100 (probably the Voice of the Mojaied).

Asian and Pacific Stations

Radio Afghanistan's broadcasts to overseas are being noted again on 8.635MHz at 1830 in English. Voice of Great Firdos Programme noted sign-on at 2053 on 5.05MHz with a monotonic bell sequence, repeated several times up to announcements in Chinese and programming from 2100. Whilst the Second Programme is heard regularly on 4.90MHz with bells and announcements from 2154, with a
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Practical Wireless, January 1993
cluttered parallel on 6.0MHz, sometimes identifiable.

Zxingjiang PBS can sometimes be heard signing on (under Eccos del Torres) on 4.98MHz with a much clearer parallel on 5.06MHz from around 2250. The signal is a tone sequence on belts, similar to Radio Beijing, followed by announcements.

In Lhasa, Xizang PBS is occasionally heard signing-on at around 2305 in the Chinese service, with very weak signals but the usual bell-like signal clearly definable on 4.75MHz. An occasionally light noise background permits the logging of the Tibetan service on 4.035MHz at around the same time, also extremely weak, on a band filled with local simplex RT channels.

The RTM Sarawak service, Kuching, on 5.031MHz has been detected occasionally under a simplex RT channel. There is currently a transmission for bullying pigs in Sarawak on 5.0301MHz has been detected occasionally under a simplex RT channel. There is currently a transmission for bullying pigs in Sarawak.

North, Central And South American Stations

Broadcasts to Canadian Forces stationed abroad continue on the facilities of Radio Canada International, and may even be expanded by the Spring of 1993. There is currently a transmission for Somalia and Cyprus at 2000, lasting variable, possibly new, Radio Continental (on 5.03MHz) - which identifies with an apparent Caracas base - at around 2230.

Radio Cuba

Radio Havana Cuba observed strongly in English to 'Europe and the Caribbean' on 17.055MHz at 2100 with DXers Unlimited at 2135 on Saturdays. There is also English service on 13.66 u.s.b., 15.22 and 17.77 to Europe, Africa and the Middle East at 2100-2300 and English to North America announced as 9.655 at 2200, with SID to 433.

New station, Radio Continental en Venezuela, has been noted with a very strong signal in Spanish with an identification on 5.03MHz and an address in Caracas. Presumably this is either a relay of the medium wave outlet on 590kHz or a separate transmission.

Sri Lankan DX Report From Asantha R Cooray

Radio Almara Ata in English 1800-1900 on 3.955, 4.40, 5.035, 5.96, 5.97, 9.905, 15.215, 15.315, 15.385, 17.605 and 17.715MHz. Best results in Colombo from 5.035MHz. The station has a new address of PO Box 4750, Almaty Ata 480015.

Radio Bangladesh noted in English 1800-1900 on 12.05 and 15.02MHz.

ORTB Cotonou, Benin with Home Service 1600-2300 and news in French at 1930 and English at 1800 and 2130 all on 4.87MHz.

Radio Botswana in Sebele has English 1700-1900 on 4.82 in parallel with variable 3.365MHz.

Voice of Myanmar, Burma, with home service in Burmese on 4.725 from 0000-1500 and in English on 5.985 from 1430-1600.

Voice of the People of Kampuchea in Cambodian 1100-1400 on 4.91 and 6.09MHz.

In China: Xizang PBS, Lhasa with home service in Chinese and regional languages on 4.75 and 5.24 from 1000-1450; Xianjiang PBS, Urumqi in Kazakh from 1100-1630 on 5.44 and 4.33MHz; Xianjiang PBS, Urumqi in Uighur on 5.80 and 4.735 from 1030-1800; Huanan PBS, Changsha in Chinese 0900-1600 on 4.99MHz; Guangxi PBS, Nanning in Vietnamese 1000-1600 and Chinese on variable 5.05MHz. Heard in Colombo with interference from Singapore Broadcasting Corporation Radio one on 5.052MHz.

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- Optional 50-905MHz receiver unit.
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- Compact size for convenient portable operations.
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